# REPORT ON THE FAMINE

OF

# 1860-61.

## SECTION I.

### DESCRIPTIVE DETAILS.

FROM

COL. R. BAIRD SMITH, *C.B.*,
*On Special Duty,*

TO

WILLIAM GREY, ESQUIRE,
*Secy. to the Govt. of India,*

HOME DEPARTMENT,
*Dated Roorkee, the 25th May,* 1861.

SIR,

I HAVE the honor to submit, for the consideration of His Excellency the Viceroy and Governor General in Council, the following Report on the general condition of those parts of the North-Western Provinces and the Punjab which are now suffering from drought, and of which I have recently completed an inspection tour.

2. Chart No. 1 attached hereto, shows the route taken by me through the suffering Districts. On it are also noted the number of days I was able to devote to inquiries at each important point. Districts were invariably traversed in the day time, so that as much as possible might be seen of the condition of their crops and people. It being necessary with limited time and means of observation to judge of certain points by samples only, care was taken to select such samples as should be as characteristic as possible of the points concerned. To examine personally for example all the bad parts even of one District was plainly impracticable, but to see some of the very worst parts of the suffering Districts was essential to my object, and, to meet this want, sample-localities were chosen and carefully inspected. With the people themselves I held the freest possible communication, extending my enquiries

among all grades; from the laborer I found working toilfully at his well to the Native gentleman of large property. The nature of my service in these Provinces through so many years had thrown me specially in contact with the agricultural classes, and nearly all the localities visited by me now had been familiar to me in past years, so that I was well able to contrast their actual with their previous condition. From the District Officers of every District, I received the amplest and most cordial aid, all their abundant stores of local knowledge and experience being freely tendered for my use. I sought evidence also from European gentlemen having property of their own in the suffering Districts; from Officers on the Railway works whose daily duties kept them in the midst of some of the Districts where the pressure was heaviest; from Officers of the Irrigation Department who had many opportunities, as they carried new lines of water channels through the most parched tracts of the country, of judging of the actual state of the people from personal observation; from Officers in charge of special relief works; from traders having wholesale dealings with the farmers, and from all others with whom I had opportunities of communicating whose evidence had any special value. Such statistical statements as I found it necessary to ask for have been freely supplied, and on the whole I believe that the broad basis on which the conclusions I shall have to state are founded, give them fair claim to accuracy and confidence. The investigation of so large a subject is however a matter of very great difficulty, and though I have perfect confidence myself in the general soundness of the judgments I have formed, I cannot expect them to be accepted by others without some such details as I have just given of the sources whence the materials for them have been drawn.

3. In speaking hereafter of the districts where the drought has been most severely felt, I propose to call them collectively the Famine Tract; meaning thereby the whole area within which extraordinary measures for the relief of the population from the effects of dearth of food have been necessary. There are several districts bordering on the Famine Tract where suffering has been considerable, and where even some means, beyond those ordinarily used to lighten such pressure, have been resorted to; but the suffering is not such as fairly to bring these localities inside the Famine Tract proper, and I have accordingly excluded them. Again there are bordering Districts in which extraordinary relief measures have been used to a very large extent, and heavy local expense incurred, although there is not a single inhabitant of those Districts probably who has suffered from the pressure of want due to the drought. The strain on them has arisen exclusively from their having become the recipients of part of the population of the Famine Tract, forced into them by the grievous pressure in the homes they had abandoned. This is particularly the case with the Districts on the Grand Trunk Road in the lower Section of the Doab, and though they have had a magnificent harvest generally, and their own people are in comfort and prosperity, they have yet

had to support, and most generously they have supported, a large mass of pauperism. Such Districts are of course excluded from the Famine Tract proper.

4. As thus limited and defined, the Famine Tract is very distinctly marked. It is represented in Chart No. II attached to this report, and its boundaries may be thus briefly described. Nature has provided for its sub-division into three separate sections by physical differences of surface, climate, and peculiarities of sub-soil, so characteristic that the adoption of this natural division is equally necessary and convenient.

5. These Sub-divisons are, 1st.—The Western, which lies wholly on the right bank of the River Jumna. It includes the Cis-Sutlej Districts of Umballa and Thanaesur, within parts of which the want of water has told very severely. The richly irrigated District of Paneeput and the Northern (Pergunnah) Sub-division of the Delhi District have virtually escaped all injury by reason, firstly, of their being traversed by the Western Jumna Canal; next of the continued drought having relieved them from the broad areas of swamp by which they are ordinarily infested, and having turned these useless lands into productive fields; and last, of the low damp valley lands bordering the Jumna having been also dried so as to become culturable, and to give an abundant produce. These resources have sufficed to mitigate pressure where it may have shown itself, and over by far the largest part of the area indicated, they have guaranteed wealth and abundance. South of Delhi, and along through its Southern Sub-division, through the Bullubgurh lands, and over nearly the whole of the District of Goorgaon, the misery of the people shows deepest and darkest of any part of the whole famine tract. It is this part of the Western Section of the tract which gives it its most definite characteristics. Under even the best circumstances, having a rain-fall never rising beyond two-thirds, and often falling below one-third of that in the Districts of the Doab, and while thus deficient being also most uncertain and precarious, its ordinary condition is a sort of chronic drought. Its soil is generally so light as to feel sensitively the want of rain; its sub-soil waters are very liable to be brackish; the depth of the water-table of the country, or the stratum to which wells must be carried down to secure a continuous supply, is generally very great; a considerable portion of the area is of bleak and barren rocks or deep ravines; the drainage is under indifferent control, and the rivers sometimes run as wild as those of the Pontine marshes or the Tuscan Maremma. The country was greatly harassed and disturbed during the mutiny from its vicinity to Delhi, and its complete occupation for long by the mutinous troops. Altogether it might have been expected that in a drought so bitter as the present, this part of the Famine Tract would from natural, political, and also in some measure from social causes (certain sections of its population being very turbulent and unmanageable) show a deeper shade of suffering than elsewhere, and such has no doubt been the case.

Passing beyond Goorgaon, the Western Section leaves the Punjab and enters the North-Western Provinces, including the whole of that part of the District

of Muttra which lies West of the River, and here too the suffering has been very intense, though relief has been sought by the people in spontaneous emigration to an extent unequalled perhaps in any other District. It then takes in Agra, including however only one Sub-division (Pergunnah), named Furrah, Westward of the River, and on the Southern boundary of that Sub-division, the Famine Tract West of the Jumna terminates. Below this line the pressure is not so great as to require any extraordinary expedients, except at the City of Agra itself, which is in an exceptional position, lying just on the very boundary line of the true Famine Tract. The Jumna on the East, and the base of the Himmalayas on the North, complete the boundaries of this section.

6. *2nd.*—The Central Section lying wholly between the rivers Jumna and Ganges, presents a very different aspect to the foregoing. Under ordinary circumstances it is one of the richest sections of these Provinces. Having a large proportion of its landed proprietary belonging to tribes known for their devotion to, and skill in, agricultural pursuits, its cultivated area has been progressively encroaching on its waste lands ever since the public demand was permanently settled. The latest measurement shows that in periods varying from 12 to 5 years rather more than half a million acres of new land had been added to its productive area. Falling away from the base of the Himmalayas with a gentle and continuous slope, its surface presents none of those rugged features so common in the Western Section of the tract. Its Hydrography is regular, as might be expected, from the regularity of its fall and surface. All its drainage is gathered into definite channels; wastes of swampy land are rare; the great boundary streams receive and carry off its surplus waters, and, excepting in the extreme North, water is usually in its right place as the slave of man, and not his tyrant. The soil is generally good; often of the richest kind. The level of the water bearing stratum, which is so infinitely important to the agriculture of the section, is high, and of late years has over broad areas been raised higher by the influence of percolation from the canals of irrigation, and their numerous channels. In means of artificial irrigation, this section far surpasses any other part of the Provinces. Its Districts are plentifully studded with masonry wells, and what is perhaps even more important, they possess in the vicinity of the sub-soil water to the surface, and the general tenacity of the sub-soil itself; facilities for the multiplication of temporary wells to an extent only limited by the quantity of labor available for sinking them. In such a time as the present such facilities imply to all, except the worst cultivating tribes, security from actual want at any rate, if not more. The ordinary rain-fall ranges from 30 to 36 inches, and in favorable years is so distributed that about four-fifths of the whole falls between June and September, or the early part of October, and the remaining one-fifth between October and March. The most characteristic feature of this section in reference to irrigation, however, is the large canals by which it is traversed. These have not reached a tithe of the development that waits them, as the various channels under construction are brought to completion, although, even now in their incomplete

state their action for good, both as insurances against loss of produce and stimulants to increased production, has been energetic in the highest degree.

So favored then with a preponderance of agriculturists who rise to face their difficulties with a vigorous industry, with a plentiful rain-fall, supplemented by a great mechanism of artificial irrigation in the forms of permanent or temporary wells and large canals, with physical conditions all well adapted to insure a healthy agricultural progress, intersected too by the best roads known in India, and thus open to receipts of food from distant parts; it might have been anticipated that when a period of heavy pressure came, this Central Section would develope a power of resistance proportioned in some degree to these, its great and manifold advantages. Such a power of resistance has, I believe, been shown in remarkable intensity, as I shall have occasion to prove more definitely hereafter, and heavy as the sufferings in some parts of the section have been, they would have been very much heavier but for the mitigating causes just indicated.

The boundaries of the Central Section are—on the North the base of the mountains; on the East the Ganges, and on the West the Jumna. The Southern boundary line crosses the Jumna at Agra, and includes two Sub-divisions (or Pergunnahs) of that District on the left bank of the River, called respectively Khundowlee and Ferozabad. It then traverses part of the Mynpoorie District, where it also includes only two Sub-divisions named Shekoabad and Moostaffabad, continuing Eastward it strikes on the Northern boundary of the District of Futtehgurh, and follows it until it meets the Ganges. It thus includes the following Districts of the Upper Doab falling within the Agra and Meerut Divisions:

2 Sub-divisions of the Agra District.

2 Sub-divisions of the Mynpooree District, Allygurh.

5 Sub-divisions of the Muttra District, Boolundshuhur, Meerut, Mozuffurnuggur, and Saharunpoor.

7. *3rd.*—The Eastern Section lying entirely on the left bank of the River Ganges, and having special characteristics quite as marked as those of either of the other two sections, falls exclusively within the Province of Rohilkund, and includes three Districts of that Province, *viz*:—

Budaon
Moradabad
Bijnour.

Here the sub-soil water is so near to the surface that artificial irrigation is used to a comparatively limited extent. The rain-fall is large, generally from 36 to 40 inches; the climate perennially much more moist than it is Westward of the Ganges. The soil retains moisture well, and is in other respects generally good, producing Sugar and Rice, the great staples of the Province, in rich abundance. Food grains other than rice are grown only for internal consumption, and not always in sufficient abundance for that. As illustrative of the most marked distinction between the agricultural condition of the Central and Eastern

Sections of the Famine Tract, I may note from a return now before me, that while the former possesses fully 70,000 masonry wells or the equivalents of such wells, the whole Province of Rohilkund is represented as having less than 1,000. In Bijnour and Moradabad not a single well seems to be employed, or to be recorded as employed in agriculture, and Budaon has all the wells there are in the country. The only little canal the Eastern Section possesses is in Bijnour, and it has, I believe, fallen almost into disuse since the mutinies.

This remarkable moisture of climate and soil has not been wholly destroyed even by the protracted drought. The produce of the year has still felt its influence, and will be fully 2-5ths of that of an average year. Further the existence of numerous low lying river valleys, where ordinarily swamps abound, but which now are just so dry as to be good pasturage or culturable land, and extensive forest tracts on the North, outside and inside the lower ranges of the Himmalayas, supplying places of refuge to the population, have tended greatly to mitigate the intensity of suffering in each of the Districts under notice.

The River Ganges forms the Western boundary of this section, the Southern and Eastern are the corresponding boundaries of the Budaon, Moradabad, and Bijnour Districts, and on the North it is defined by the outer ranges of the Himmalayas.

8. Having now fixed the outer borders of the famine tract, and sketched generally the characteristic differences of the three sections of which it is made up, I beg to refer to Appendix No. I for a variety of statistical details of interest connected with it. I need not load the body of my Report with these, as they can be referred to by all desiring to consult them. It is sufficient to give the following summary here in round numbers :—

| Section of Famine Tract. | Population. | | Areas of Cultivation in acres. | | |
|---|---|---|---|---|---|
| | Of the Districts or parts of the same in the Section. | Of the very bad parts of the Section. | Production in ordinary years. | Unproductive or nearly so during the Famine period. | Balance productive. |
| Eastern ... ... ... | 2,850,000 | 970,000 | 2,724,000 | 926,000 | 1,798,000 |
| Central ... ... ... | 5,353,000 | 2,258,000 | 5,054,000 | 2,026,000 | 3,028,000 |
| Western ... ... ... | 4,879,000 | 2,220,000 | 4,515,000 | 1,505,000 | 3,010,000 |
| Total ... | 13,088,000 | 5,448,000 | 12,293,000 | 4,457,000 | 7,836,000 |

9. In further illustration of points affecting the famine tract in its totality, Charts Nos. III and IV have been compiled ; the first showing in each District for which such results could be procured, the average rain fall of a good season in contrast with the actual fall of 1860-61, and the second showing the average prices of food grain under like conditions.

10. The impressions received from the external aspect of the famine tract depend mainly on the special localities from which they may have been derived. Nothing could be less uniform than this aspect. Nearly all through the more Southerly part of the Western Section the desolation is scarcely relieved by even the appearance of culture. In the Trans-Jumna Sub-divisions of Agra and Muttra, included in this section, there seemed at first sight to be no cultivation. The monotonous brown tints of the untilled soil suppressed everything else. It was only by some inquiry it could be learnt that even in this great waste there was cultivation in plots round the villages, and round the wells remote from the villages. In Southern Delhi and Goorgaon, the country between the Kootub Minar and the station of Goorgaon had been repeatedly marched over by me in all directions during ordinary seasons, and the contrast was truly startling over fifteen or twenty miles of country, where I had been accustomed to see wide expanses of gram chiefly, but also of wheat and barley growing with excellent promise; there was not a blade of green produce to be seen, excepting in the bed of some dried up tank or along the narrow valleys of Rivers, or near the sparsely spread wells; yet to have taken this dreary scene as a type of all Goorgaon would have led to error. Within the limits of a District, parts of which are thus desolate, there is an area of cultivation close upon 150,000 acres in extent which is secured in each harvest, either by irrigation from wells, or by lying so low as to retain moisture for long periods, or if not so secured has still returned some fruits for the labor expended upon it. The people who are to be sustained by the produce of this land number about 650,000 souls, and not even the lowest estimate of that produce can prove that it would be insufficient for its object, if only it could be conveyed to those who need it, or if they could be so placed as to be able to purchase their share of it. But the area secured or productive, material though it is, and so far as mere supply of food is concerned, sufficient as it may be to meet the emergency, is still only about one-third the ordinary breadth of cultivation in the District, and thus about two-thirds of the ordinary supply of agricultural labor is cast loose on a market where it is absolutely without value. The differing degrees of intensity with which different parts of the famine tract have suffered, is one of the points requiring the most careful discrimination, if serious practical blunders both of impression and action are to be avoided.

The observer passing across the Jumna into the Central Tract again runs just the opposite risk of altogether under-estimating the true intensity of the pressure from the famine. So plentiful are the means of irrigation that many miles may be travelled in each of the Doab Districts with rich crops on both hands. So earnest and active have the industrious classes of cultivators been, that all their usual appliances for culture have been strained to the utmost. The peculiar call of the husbandman at the well was to be heard as continuously during the night as during the day. No men on earth could have faced a great calamity with a sturdier resolution, or on the whole with better success; for by the timely and generous aid of Government in lightening helpfully

the pressure of its public demand upon all such villages as really needed that aid, there has been as yet very little collapse among proprietary communities of the better farming tribes or castes. In short so marked have these results been that I have been repeatedly assured by English gentlemen, who were doubtless speaking on the basis of their own personal observation, that there had been no real failure of the crops, and that they had marched through considerable sections of Districts without seeing signs of any serious suffering.

These conclusions were perfectly compatible with a limited range of observation. Even in the bad Sub-divisions of Agra and Mynpoorie, which first come under notice on entering the Central Section, and which are well known to have suffered most bitterly in parts, there are conditions that go a considerable way in mitigating the pressure. Ferozabad and Khundowlee have about 256 villages, but out of this number only about half are so bad as to need aid by remissions of revenue. Mr. C. G. Mansel, in his Settlement Report, draws special attention to the excellent qualifications of the cultivators in the Northern part of Ferozabad, but there is at the same time a large intermixture of such tribes as Goojurs, Brahmins, and Kayths, who are notable for their incompetence in agriculture, and who form rather more than 50 per cent of the population of the Sub-division. In Khundowlee half the population are Rajpoots, very uncertain cultivators, but there are many Jat villages, and a visitor to them would be pretty sure to find a fair show of cultivation even at the present time, since the general proportion of cultivation secured by irrigation is about 40 per cent. Again in Mustaffabad and Shekoabad, the suffering sections of the Mynpoorie District, the present Lieutenant Governor of these Provinces says of the former—"It is distinguished by fertility of soil, very general "irrigation, and great agricultural prosperity; the only exception, and that "a partial one, to the superiority of soil and the universality of irrigation "just noted is found in the Southern Section, where in some villages un-"productive 'Bhoor' (pure sand) lands, with all their concomitants of "imperfect irrigation, abundant 'kans' (a destructive and almost ineradicable "weedy grass), and inferior cultivation. These are the estates in which the "symptoms of the past drought (that of 1837) are alone apparent to any "considerable extent; the almost universal irrigation in other parts having "greatly mitigated the evil and distress which in less favored localities were so "prevalent and overwhelming." And of Shekobad the same authority says: "Though inferior as a whole to Mustaffabad, it is by no means unproductive or "ill favored"—its Northern Section is described as easily irrigated and inhabited by a race of cultivators rivalling the Jats or the Jhadouns of Ferozabad and Khundowlee; its central section as decidedly inferior, and its Southern Section as so bad that four-fifths of its revenue was justifiably remitted in the famine of 1837. Beyond these Sub-divisions, the District of Mynpoorie has not suffered at all, and the facts that the proportion of cultivated area secured by irrigation, ranged at the time of the settlement of the Land Revenue in 1840, from about 50 to 80 per cent, and has since been increased, not only by natural extension, but to some

extent by the influence of the Etawa terminal of the Ganges Canal, will serve to explain this immunity.

11. Continuing Northward the District of Allyghur presents the same chequered aspect. Even more richly endowed in the aggregate with means of irrigation than Mynpoorie, it shows some of the best in close contact with some of the worst of the localities influenced by the drought. Such Sub-divisions for example as Jullalee, where under ordinary circumstances the irrigated area is over 60 per cent of the cultivation; Moorsan, where it is 82 per cent; Sasnee, where it is 91 per cent, or Mackerah where it varies from 57 to 65 per cent, there is not only no real suffering but some prosperity, and this is especially the case in those sections which are profusely intersected by the distribution channels of the Ganges Canal, from which about 100,000 acres are reported to have been watered during the period of drought.

12. But in this district there is perhaps the worst or certainly one of the worst tracts in the whole Central section, that, namely, formed by the Sub-divisions of Khyr, Chundos, and Tuppul. So universal was the repute of its desolation that I selected it as one of those interior localities which it was expedient for me to see, and certainly it would be difficult to exaggerate the forlorn dreariness of its appearance. Usually it is in parts at least a fertile country, but when I traversed it in March, a few scattered plots of culture represented the broad fields one was accustomed to ride through. The country seemed denuded of inhabitants, and the emigration had been extensive. Relief houses were established at Khyr and Tuppul, and at the former place I saw three or four hundred of the most pitiable objects eye could look upon, receiving daily rations of food. Yet even in Khyr, Chundos, and Tuppul the prospect was not one of unmitigated misery. The ordinary aggregate area under culture in the three Sub-divisions is about 160,000 acres, and of these rather more than a third, or about 64,000, have means of irrigation. There had been no serious failure of these means that I was aware of, but they were scattered, and many villages had no share, or but an inadequate share in them. Here, as elsewhere, from a cause obvious on the mere statement of the preceding figures, it was the laboring classes that were thrown out of nearly two-thirds of their usual field of employment, and on them the burden fell. Those having actual rights of proprietorship or tenancy in the lands have found it practicable to sustain themselves very generally, but the men whose capital is only their thews and sinews have sunk into pauperism, or in many cases I fear into their graves.

13. The same general law of intermixture of good tracts with bad tracts prevails in the Upper Districts of Boolundshuhur, Meerut, Moozuffernuggur and Saharunpoor, and as it seems very important to a just appreciation of the true influence of the drought on the people, that the limits of such intermixture should be at least approximately defined, I have had Chart No. II compiled, to show the comparative area of these contrasted portions of each District. The general area of the Famine Tract is marked by a light shade of color. The area of these

interior tracts of greatest intensity is indicated by a very dark shade of the same color. The eye can judge at once, with these helps, of the comparative distribution of good, or more truly, comparatively good and miserably bad. There is no tract marked black within which the sufferings of the people have not been most cruel. The characteristic is one which will always prevail, and has doubtless been commonly noticed before; but it is liable to be overlooked, especially by those at a distance from the Famine Tract, or having only a superficial knowledge of it. It is important however not merely as one of the marked features of the Famine Tract, but as directing our special attention to those localities where measures permanently remedial are most pressingly required. In round numbers the area of greatest intensity is to that of the Famine Tract generally as about one to three.

14. It is impossible however to be satisfied with the simple statement of the existence of these marked internal contrasts within the Famine Tract. To give some definite and sufficient explanation of their causes seems essential. Two features, one of physical, the other of moral origin, will be found in almost every instance to characterise the tracts in which the Famine has pressed with its utmost intensity. First, nearly all these tracts are marked by high surface levels, raising them much above the average level of the sub-soil water in good tracts. This difference is sometimes due to increased height of the surface soil levels, and sometimes to depressions of the water-table levels, but the existence of a seriously increased difference in such cases is uniform. Second, the same general uniformity will be found to prevail in reference to the moral qualities of the proprietary bodies who have possession of the land, and the influence of race, and the qualities distinctive of race that seem to be as hereditary as more substantial property, will invariably be recognised as most powerful agencies in marking out the limits of the worst parts of the Famine Tract. I have now before me a Chart showing in different colors the status of proprietary occupation in the Famine Tract, and in following the colors, marking the possessions of such tribes as Goojurs, certain clans of Rajpoot descent, Rangurs, some classes of Brahmins, Khyats, and the like; these tracts are found (as from the turbulence, the indolence, or the incompetence of their possessors, it was to be expected they should be found,) in the darkest tract of the Famine. Race and its influences constantly modify physical conditions, for, isolated estates held by Jats, Aheers, or proprietors of other good tribes, in the very heart of a bad tract, will constantly be found in tolerable cultivation, and at least the utmost made of their poor resources that human industry could make of them. No such efforts are ever made by the tribes who have no natural genius for agriculture. They sink helplessly beneath the pressure of unfavorable physical conditions, and fulfil no single function of a proprietary class; not even the function of tax-paying.

15. Although the two causes just specified stand out more prominently than any others, they are not the only ones that influence the demarcation of the good and bad sections of Districts. The general action of the Talookdaree system,

so far as it has been permitted to exist in the Central Section of the Famine Tract, has been on the whole beneficial, and has tended to enlarge the limits of good tracts. Large proprietors can afford to do more than merely pay Government revenue. They can afford to help their tenants, and in most instances they have not neglected that duty. I had pleasure in making the personal acquaintance of some Native gentlemen who had been remarkably unselfish in this respect, and while held to the strict terms of their covenant with Government, and allowed no remissions, did grant such remissions as they thought were required to their sub-tenants. Of course, as among ourselves under like conditions, there were bad as well as good landlords, but on the whole I believe the large proprietors have acted with justice in most instances, and in some with generosity. As regards the public revenue, there cannot be a doubt of the value of the class. I never conversed with a single District Officer on the prospects of his District income that he did not congratulate himself on having numerous large land-holders, or lament that he had so few, as the case might be.

16. Another cause tending to intensify the sufferings in tracts possessed by turbulent tribes, has doubtless been the heavy pressure of penal fines, with which most have been punished for their atrocious conduct during the disturbances of 1857 and 1858. Secunderabad in Boolundshuhur for example is mainly possessed by Goojurs, a notorious race, and is one of the blackest spots in the whole of the Famine Tract. My attention having been specially directed to it, I visited the locality, and found it quite as bad as Khyr in Allyghur. But the pressure was increased in Secunderabad by the Goojur tribe having been fined the large sum of £45,000, of which about half had been collected, and half hung in terrorem over them, while their property had well nigh perished under the drought. They are not a tribe who have many claims on our sympathies, and probably the best thing that could happen for society would be that they should cease to be proprietors of lands they misuse, and take their fitter place as day-laborers. But the calamity of present Famine has no doubt in their case been greatly aggravated by the heavy pressure of this mulct, and as other tribes, or the same tribe in other equally bad localities, have been similarly dealt with, the influence of this cause has been considerable.

17. I am not aware of any instance within the Central Section in which it can be said that the Government Land Revenue demand has intensified the pressure. For an ordinary and average succession of seasons, the districts of the Upper Doab are lightly assessed. Many Sub-divisions of them which are traversed by canals, and have long used canal irrigation, have doubled their annual gross produce since the last settlement. Their assessment is now therefore of course unnaturally low, and inasmuch as it has been by no expenditure of their own that this enhancement of produce has been secured, it might be said that their assessment is unjustly low. However as a general rule applicable to the whole section, the assessment is reasonable, and has not tended to aggravate the sufferings of the people, because prompt relief has been given in every

case in which a just claim for it has been found to exist, and the best proof of the relief having been real and substantial, is the limited extent to which proprietors having even the humblest class of rights in the land, and capacity to use those rights, have as yet sunk under the effects of the drought. There are some very vital questions however which are raised by this reference, but they will be much more conveniently discussed at a more advanced part of this report, and I do not enter upon them at all at present.

18. The aspect of the Eastern Section of the Famine Tract is similar to that of the two other sections, in so far as the mixture of localities of very unequal intensity is concerned. But the appearance of the country is some what different. Agriculture depending here mainly on a power of retention of moisture in the soil, or a natural dampness of climate not entirely destroyed even by the drought, the breadth of land under cultivation has not so much diminished as that the produce has fallen much below the average. For example, in a comparative statement of the total produce of the District of Moradabad, kindly supplied to me by the Magistrate and Collector, Mr. J. Strachey, I find that while there is a difference between the areas cultivated in average years, and during 1860-61 of only about 50,000 acres, there is a difference in the produce of no less than about 140,000 Tons; the areas being to each other as 57 to 53, while the weights of produce are as 70 to 30, showing a trifling falling off in breadth of culture, but a most serious one in grain produced. This is just what might be expected from the physical conditions under which farming there is carried on, and it was noticeable that while you might see in travelling many fields of grain, they were all very thin and poor.

The spots of greatest intensity in this Section are mainly determined by the race of the cultivators. The physical conditions of all are pretty much alike, excepting of course in the localities of special refuge to which allusion was formerly made. It is only in Bijnour where the pressure of the Government Land Revenue is supposed to be oppressive, and where a revision of that demand will doubtless follow the experience of the present time. Emigration from this Section has been on a considerable scale, but limited, as before, mainly though not exclusively to the laboring classes or artizans dependant on these classes.

19. These general details with the help of the Charts and Tables will, I trust, be quite sufficient to give a reasonably exact view of the main characteristics of the Famine Tract, and the internal distribution of its smaller areas of greatest intensity, and I may now go on to other questions to which my attention has been directed.

20. I would first dispose of the question of the sufficiency of the available supplies of grain for the support of the people within the Famine Tract. I think it is wholly unnecessary to burden this subject with elaborate calculations. Certain broad general considerations will probably determine it more satisfactorily than in any other way. There can be no doubt as to the abundant supplies in the Districts surrounding the Famine Tract. The free flow from them into

the markets there, even before the spring harvest became available, showed that grain was then plentiful. The spring harvest has everywhere, beyond the influence of the drought, been rather above than below the average yield. Within the tract itself between two-fifths and three-fifths at least of the cultivated area will be found to yield crops of variable quality, but generally good, excepting under such an aggravation of the drought as we need not anticipate at present. And so far as mere supply of food is concerned, such a proportion would be in itself almost a guarantee against any absolute deficiency. Reinforced by the surplus produce which would instantly begin to pour in from the outside on any great rise of prices, as past experience has amply proved, the combined quantities would, I feel confident, keep the markets at least sufficiently supplied to make a real dearth of food altogether improbable. On this point I must say that as yet I do not see the faintest grounds for anxiety. And even if our hopes of a favorable rainy season should be disappointed, the practical question will then be, not so much how to get food, as how to get the starving people to the food, or the food to them in the cheapest and most expeditious way. If the spirit of private speculation should fail in bringing sufficient supplies to market, other means will doubtless be used, but that food itself will fail us even under the worst contingency, I consider so unlikely that I do not think it needful to dwell longer upon it. It may however be observed that having had occasion to examine many references to the last great famine, I do not find that any dread of deficiency in the quantity of food was ever expressed then even under the heaviest pressure. Twenty-five years ago the country generally was much more likely to suffer from such a deficiency than now, and in this respect I think we may face the future without fear.

21. The methods of relief adopted within the Famine Tract for the mitigation of the sufferings of the people form the next part of the subject to which attention may be given.

In all countries and in their best conditions, there is ever a large mass of permanent pauperism which the community is bound to sustain either by moral or by legal obligations. The helpless from disease, age, infirmity, or other causes, make up for the most part this painful aggregate, and on the occurrence of any such calamity as the present, these paupers give the earliest signs of its existence. Living precariously at all times, the general pressure contracts even their very uncertain means of support, and they are the first claimants for relief. Their numbers are soon swelled however as the pressure grows more intense by those whose strength has failed them; women possibly deserted by their husbands and left with infant children; children similarly deserted by their parents or left orphans, and many others who from different causes are reduced to helplessness. These then, the helpless poor, form the first great section of the sufferers, to whom attention is imperative. In speaking of them as helpless, it is not meant that they are absolutely incompetent to any personal efforts, but only that they are not fit for out-door labor.

The other great class is the able-bodied poor, meaning thereby all those men, women, and children who are competent to out-door labor, and can

be employed on works. The able bodied however are no more capable of full work than the helpless are incapable of any, the gradations of strength in both being of course many. The systems of relief for those two great classes having distinctive features, may be described separately.

22. The helpless poor were rightly made the special charge of the European and Native community, and the organizations for their relief were formed exclusively on the basis of voluntary and non-official efforts. The local Government laid down certain broad general rules for guidance, and supported its right of interference by contributing donations equal to the amount of private subscriptions. But considerable freedom had been left to local action, and as the natural result, general rules had been variously interpreted.

It may be proper to state here that I shall describe the system of relief for the helpless poor, not as it may appear in printed papers, but from general observation of it, as I saw it in actual work in about twenty separate localities scattered throughout the three sections of the Famine Tract.

Relief from hunger by the supply of *cooked* food is the main characteristic of the system, and I saw but one or two instances of its being departed from in the course of my inspection. At Futtehghur, rations of uncooked food were being issued, and at Delhi I found money was distributed at one of the places of relief, paupers coming twice weekly and receiving a sum, graduated according to the number of the family, for their support during the intermediate time. Unhappily the latter plan is so provocative of abuses, notwithstanding the most anxious care to prevent them, that I do not think it ought ever to be resorted to. In fact it is as a corrective of or a preventive to abuses, that the supply of cooked food works so well, and excepting in very special cases, and under very peculiar circumstances, I am satisfied it should be rigidly adhered to; I found an absolute unanimity on this point among Native Committees, and as all personal details connected with the food are left exclusively to them, the plan has not in my experience been the subject of a single complaint.

A District Committee supervises the details of distribution, members taking it in turn to be present when food* is given out. The task is laborious, and not wholly free from danger, as infectious diseases, such as small-pox, are very common. The time occupied is never less than about two hours, and is sometimes twice as much in large stations. Nothing could surpass the hearty zeal and earnestness with which these supervising duties were generally performed and carried on as they have been through the whole of the hot season, the strain has been most cheerfully accepted by the European Community, while some of the very best local plans for relief I have seen, have owed their efficiency, I am happy to be able to record, to the intelligence, personal interest, and unwearied industry of the Native Members of Committees. This was specially the case at Moradabad, where the best organized Relief House

* Rations vary, but the following are Averages:—

| | | |
|---|---|---|
| For men and women with infants ... | 16 oz. | Bread. |
| | 4 „ | Vegetables. |
| For women and lads ... | 12 „ | Bread. |
| | 4 „ | Vegetables. |
| For children above 10 ... | 12 „ | Bread |
| | 2 „ | Vegetables. |
| For children below 10 ... | 8 „ | Bread. |
| | 2 „ | Vegetables. |

I saw during my inspection exists, and I do but echo the judgment of the Magistrate, Mr. J. Strachey, in saying that the practical working out of the whole scheme, of which he supplied the leading principles, was due exclusively to the Native Committee, and pre-eminently among them to the Chief Native Judge, Syud Ahmud Khan, a gentleman whose devotion to this work has been admirable, and whose knowledge of the political economy of famines was singularly exact and sound.

There was of course an infinite variety in matters of detail in the systems practised in different Districts. At the time I saw most of the Relief Houses they were only taking form, and mistakes were occasionally noted. These were pointed out wherever the opportunity was given in kindly consultation with the Committees or their executive members, and the recommendations generally made by me can be judged of by reference to Appendix No. II in which they will be found thrown into specific form. It need only be said here that the characteristics of a safe and effective system of relief for the helpless poor seem to me to be mainly these :—

1*st.*—Relief by cooked food only; the nature of the food however being cautiously adapted to the physical strength of the paupers.

2*nd.*—Either a careful system of selection by the personal enquiries of competent Sub-Committees or permanent residence within the Relief House, should be conditions of *continuous* relief. No conditions need be attached to casual relief excepting evidence of suffering from hunger, about which there is rarely any risk of error.

3*rd.*—The principle that all who can work shall work in ways suited to their capacity should be carried out as much as possible with permanent paupers. A Relief House gradually developed into a true work-house, where the totally helpless are cared for and supported, while the partially helpless are occupied in such light work as they are accustomed to, or are fit for, is the most satisfactory form the relief of this class of paupers can assume. I have seen it in action only at two places, Moradabad and Roorkee, but I have reason to believe that the principle is now adopted in other stations also, and should the necessity for continuous relief be protracted, the plan will probably become general.

4*th.*—Relief should be interpreted liberally, and be made to include relief from nakedness as well as hunger, and from disease by medical treatment and hospital comforts.

5*th.*—Cautious extension of out-door relief in the cases of female paupers of respectable position, by whom appearance in public would be felt as an intolerable degradation. When practicable, appropriate labor may be required in exchange for food.

6*th.*—The extension of Relief Houses throughout the interiors of Districts, especially in the sections of greatest intensity wherever European or reliable Native supervision can be secured. Without such supervision the action of

detached places of relief is liable to much abuse, and involves great waste of means. Respectable Native supervision, with only occasional European control, may however be trusted, and the relaxation of the first orders of Government, making the continuous presence of Europeans indispensable, has no doubt been beneficial.

It is not practicable at the present moment to give an accurate statement of the extent of the relief system for the helpless poor, as the returns of the District Committees are still incomplete. But in Chart No. V will be found the distribution of Relief Houses so far as known to me on the 30th April, and a general approximate estimate of the number of helpless poor relieved. This estimate must be considered as subject to future correction when returns are completed.

Up to to the 30th April, 1861, it would appear that 26 Central and 75 District Relief Houses have been established in the Famine Tract, and in Districts bordering on it, and that on the average 80,000 are relieved daily at these places. The rate fluctuates considerably from day to day, and in April, the ripening of the spring crop drew many out of the Relief Houses, and took them to their village fields to reap and house the harvest. The number may be expected to increase again from May onwards to July, and if the coming rainy season should prove favorable, the pressure will begin to lighten from August. By October next, it will be possible to suspend the system generally, and allow the people gradually to relapse into their ordinary course of life. If the rain should not be favorable, an alarming increase of intensity in suffering through all classes must be looked for, and the number of helpless poor will be deplorably augmented.

23. For the relief of the able-bodied poor a series of "special relief works" have been organized, both in the North-Western Provinces and the Punjab, on principles much the same, but with details varying according to locality and other circumstances.

The primary condition of admission on these works is, that applicants shall not be so helpless as to be unfit for ordinary labor in digging, carrying, and the like. If they are so helpless, they properly fall under charge of the agents for relief of the helpless poor, but they would be improperly placed on special relief works. Some confusion of thought is apt to arise on this point, and it is well to notice it Officers in charge of special relief works find men, women, and children reach them so grievously exhausted as to be utterly useless for some time afterwards. It is of course essential that these poor creatures should have all needful help, and should not be sent away. But the means of helping them should be provided from the funds supplied for the helpless, and not from those provided for the able-bodied poor. No Officer having to deal with such a case would ever find the slightest difficulty in procuring the means of supporting them till they were fit for work, either from the District or Central Committees. It is only an act of justice towards Government to meet such a demand, inasmuch as Government has liberally subscribed towards the sustenance of the helpless by doubling all private subscriptions, and ought not to be again taxed for the same class by having to pay. for them on special relief works also.

All people then willing to give labor in exchange for wages are admitted on these works. The wages given are calculated at the lowest rate needful for subsistence, and for that only. Profit on labor that is not wanted, but is a mere drug in the market, is wholly out of the question. It is in a pecuniary sense even at least a very expensive method of working, for the average capacity of the workers is much below that of ordinary laborers, and the cost of work so executed must always be high. But no middle course exists between employing those people and maintaining them. They certainly cannot support themselves, and it is better far to accept the high rates of work consequent on their employment than to let them subside into the class of helpless poor or die. It is clear that on special relief works no specific rates can possibly be fixed. They must range from very nearly the entire cost of subsistence to the rates due for ordinary labor, according to the comparative working capacity of the people employed, and may at any time show fluctuations dependent on this capacity alone, and thus be wholly beyond the control of the Officer in charge. Some Officers have tried to work within limiting rates, but it is only practicable to do so systematically by overlooking the fact, that wages on special relief works are subsistence wages only, and cannot be retrenched for short work without starving the work-people. It is remarkable, however, how well and cheaply, amid all the difficulties of the case, an energetic Officer can execute special relief works. But this comparatively satisfactory result cannot be obtained by reducing wages. It depends on close personal supervision, on the careful adjustment of tasks to strength, in the formation of working parties, so that the strong and the weak may each have just the kind or quantity of work they are best fitted to do. In this way the best may be made of the system, but at best it will never be an economical one. It however returns in labor a sensible proportion of the cost of maintaining the people, and what is perhaps of more importance, it teaches them to continue reliance on their own capacity to work as their best means of subsistence, and maintains their self-respect by keeping them above the position of helpless paupers.

The wages allowed are 1½ annas, or about 2¼*d.* for each man, 1 anna, 1½*d.*, for each woman, and half an anna, ¾*d.*, for each child. A man, his wife, and three children can thus earn four annas or about six pence a day, on which the whole party can so subsist as to have their capacity to work fairly maintained. The same can be done on each separate wage, though of course family groups fare best.

The work people are ordinarily organized in gangs of 500 each, to which a separate cash-keeper and series of petty officers are attached. They live usually in light sheds on the works; have grain shops moveable with them; occasionally, as on the Hill Road through the Sub-Himmalayas, where 17,000 or 18,000 people are gathered into one place, Officers of the Civil Department reside on the spot to maintain order, ensure supplies, and the like, while the

Engineers attend to the works only. On one of the relief works payment for labor was at first made in flour uncooked, but this soon brought on such a system of rude barter that it was wisely abandoned, and a subsistence money wage substituted. Men had to buy fuel with a little flour, salt with a little more, and so on with other petty purchases, and the small merchants who are always the most convenient channels for such transactions, were put to so much inconvenience by these barterings, that they refused to work. The less our systems of relief derange the ordinary machinery of society, and the more they can be made to dovetail themselves into it, so to speak, the better they will always be found to work.

The chief "Special Relief Works" authorised are the following:—

| | *Approximate number of people daily employed.* |
|---|---|
| The Road from Roorkee to Deyrah, crossing the Sub-Himmalayas ... ... | 18,000 |
| The Road from Haupper to Gurmuktesur ... ... ... ... | 7,500 |
| The Hindun River diversion ... ... ... ... ... | 4,000 |
| The Futtehghur Branch of the Ganges Canal ... ... ... ... | 6,000 |
| The Boolundshuhur Branch of the Ganges Canal ... ... ... | 4,000 |
| Works at Agra ... ... ... ... ... ... ... | 18,000 |
| Road from Shekoabad ... ... ... ... ... ... | 4,000 |
| Irrigation Works near Agra ... ... ... ... ... ... | 2,000 |
| Works at Delhi ... ... ... ... ... ... ... | 15,000 |
| Works in Delhi District ... ... ... ... ... ... | 15,000 |
| Road from Delhi to Muttra ... ... ... ... ... ... | 8,000 |
| Irrigation Works in Goorgaon ... ... ... ... ... | 5,000 |
| Works in Rohtuk ... ... ... ... ... ... ... | 3,000 |
| Works in Hansi ... ... ... ... ... ... ... | 4,000 |
| Works in Hissar ... ... ... ... ... ... ... | 3,000 |
| Various petty works in Districts of the North-Western Provinces, some rather large, some small, averaging say 1,500 per District ... ... ... | 16,500 |
| Ditto Ditto in the Punjab ... ... ... ... | 10,500 |
| Grand Total employed daily on all kinds of special relief works ... | 143,500 |

I have given these numbers only from general information, not from the accounts, but the result is, I believe, approximately correct.

In reviewing this plan of relief I am satisfied that it has proved a most healthy and satisfactory success. The worst parts of the Famine Tract have been traversed by long lines of works, or by smaller detached works to which the suffering people have freely resorted. They have left them too, whenever the ordinary farming work of the country required their presence. The effect produced on all the working parties by the call for labor to cut the spring harvest was most marked. About half the number left, and having been absent about a fortnight or three weeks, they began again to return, and very soon restored the previous strength of the parties. There was thus a healthy sympathy between the working of the plan and the general wants of the

country. No real inconvenience was caused by the withdrawal of so much labor, as such proportion of it as was wanted by the farmers, spontaneously met their call, and was only employed by Government when there was no employment for it elsewhere.

The pecuniary burden has however been a heavy one on the State. It is estimated that the entire cost of special relief works, great and small, throughout both Provinces, will not be less than about £ 250,000.

24. The ordinary operations of the different Departments employed in executing public works throughout the Famine Tract, have supplied an additional means of relief, of which the influence has been extensive. Labor being paid for there on the usual terms, they are resorted to only by workpeople capable of full work, and they thus form the final link in the chain of relief. The Relief House paupers, when sufficiently restored to be fit for out door-labor, are drafted off to special relief works, and when still further restored, so as to be fit for full work, they may earn full wages by passing off to one or other of the ordinary public works of the country. The East Indian Railway, which passes right through the heart of the worst part of the Central Section of the Famine Tract, and the numerous channels under construction by the Irrigation Department, are the most prominent and most useful of these works. It is difficult to estimate their entire effect, but it will not be far wrong to say that they give daily employment in all parts of the suffering Districts to between 40 and 50,000 people.

25. By the combined action of this machinery of relief, suffering that is visible and tangible, or that declares itself openly and seeks help, may be, and in large measure is, met and mitigated. But there are forms of suffering which as yet no part of our relief system has reached, or, as at present constituted, can reach. I have already alluded to the cruel sufferings of certain tribes in the Famine Tract whose low qualifications as cultivators make their lands as little useful in supporting them as they can be. But in addition to such habits these men have a pride of race and family that keeps them away alike from our relief houses when helpless, and our relief works when capable of work, and they deliberately prefer to remain in their wretched villages and die, rather than either to seek for charity or to work on public works. Such has been the uniform experience hitherto in the Districts where these tribes of Rajpoot descent, Goojurs and others of the same type, predominate. We totally fail in administering help to them, and of the sad mortality among them there can I believe be no reasonable doubt; yet how to meet this case is extremely difficult. Help in the way of temporary or permanent relief from demands for land revenue is willingly accepted, and has been largely given, but to relieve people from a tax only when nearly all the produce of the land on which they ordinarily live has perished, is a mere shadow of relief. The reputation of these people for common honesty is unhappily so low that even their head-men cannot be trusted to distribute relief among

them, and for supervision in any systematic way the ordinary District agency is quite inadequate. It is possible perhaps that the funds of the Central Committees, now so ample, might be drawn upon to meet the expense of such an addition to the ordinary District agency as would suffice to ensure these people being relieved in their own villages to such an extent as would save them alive. As a general rule, and under ordinary circumstances, it may be right that if a man will not work, no more shall he eat; but it is hard to reconcile ourselves to the belief that it can be right to leave men, women, and children to perish in the miseries of famine, because the adults of the race are under the dominion of perverted feelings. I have accordingly addressed the President of the Central Committee at Agra, among whose members are gentlemen who know well from personal knowledge the peculiarities of the races I am referring to, and have sought for this distressing subject their careful consideration.

26. I have now exhausted the subject of forms of relief administered by the general community or by the State, but there remain some details to be given of those spontaneously adopted by the sufferers themselves. Among these by far the most important, or more accurately the only important one, has been emigration. In all times the population of India has been notable for its mobility under pressure, whether personal or fiscal. A population crushed under a bad Government, seeks relief by migrating to a province under milder rule, and similarly, when crushed under a bad season, it almost intuitively seeks the same form of relief. Even before any special arrangements for their relief had been made, the people of the Famine Tract had adopted their traditional course, and were streaming out of the bad districts into those more or less near in which the crops had been good, and food grain was cheap. This exodus assumed a double direction. In one case it poured towards prosperous districts of our own or of adjoining foreign States lying entirely beyond the Famine Tract. In the other it flowed from the bad to the good; from the darkly to the lightly shaded portions of suffering Districts, as shown in Chart No II. The determining causes in the former instances were probably only the known cheapness of food and the fair chance of work. In the latter brotherhood feelings and the claims of a common clanship came largely into play; thriving villages in the well irrigated parts of the Famine Tract receiving their brethren from the suffering parts, giving them a share of the culturable land of the estate to work upon, and so to earn their food. In many cases, however, where means did not exist for any considerable extension of cultivation, the reception of clansmen told injuriously on the ordinary village laborers whose work was transferred to the new comers, while they were themselves compelled to seek employment on relief, or public works, or possibly to emigrate. It would be of interest to trace these outer and inner movements of the unsettled population, but to do so with any approach to accuracy would need long and careful enquiries in each District, which cannot at present be made. The inner movement would illustrate very strongly an

indirect benefit due to extensive irrigation. It creates the ability in times of pressure like the present, to shelter a population far greater than usual, and to give them employment remunerative to all concerned. New lands are brought under cultivation, or old lands are more elaborately tilled than usual, and it is a fact noticed universally in the harvest just cut, that either as a consequence of much virgin soil having been broken up, or much land hitherto without water having received it, or much more labor than ordinary having been applied in tillage, its yield has been of unusual bulk and weight. The result is no doubt due to the interior emigration I have alluded to, and the additional stimulus it has supplied.

Although it may not be practicable however to measure with accuracy the actual extent of these movements, some information has been supplied to me which admits of an approximation being made to it. Muttra may be taken as a type of the Districts from which the emigration has been greatest. It was one of the first things which struck me on entering the Famine Tract, about the middle of March last, that almost every traveller or family group I spoke to on the road reported that they had left the Muttra District, and as before mentioned, the sufferings of the people there have been very bitter. The following table supplied to me by the kindness of the Magistrate, Mr. H. D. Robertson, shows from local inquiry the actual extent of the emigration from the different Sub-divisions of the District.

*TABLE showing the extent of Emigration from the District of Muttra up to April* 1861.

| Pergunnahs or Sub-Divisions. | Number of persons emigrated. | | | | | | Grand Total. | Per centage o emigration on total population. |
|---|---|---|---|---|---|---|---|---|
| | Agricultural. | | | Non-Agricultural. | | | | |
| | Men. | Women. | Total. | Men. | Women. | Total. | | |
| Nojheel ... ... ... ... | 1,147 | 874 | 2,021 | 1,464 | 1,174 | 2,638 | 4,659 | 10 |
| Kasee ... ... ... ... | 813 | 616 | 1,427 | 655 | 516 | 1,171 | 2,598 | 4 |
| Sahar ... ... ... ... | 5,876 | 4,196 | 10,072 | 2,024 | 1,379 | 3,403 | 13,475 | 13 |
| Arung ... ... ... ... | 3,115 | 2,501 | 5,616 | 1,108 | 960 | 2,068 | 7,684 | 8 |
| Muttra ... ... ... ... | 1,226 | 907 | 2,133 | 344 | 284 | 628 | 2,761 | 2 |
| Maat ... ... ... ... | 5,245 | 4,000 | 9,245 | 3,945 | 3,077 | 7,022 | 16,267 | 16 |
| Mahabun ... ... ... ... | 4,057 | 2,942 | 6,999 | 3,797 | 2,926 | 6,723 | 13,722 | 16 |
| Sadabad ... ... ... ... | 2,763 | 2,010 | 4,773 | 3,805 | 3,051 | 6,856 | 11,629 | 11 |
| Jallaisur ... ... ... ... | 6,195 | 3,922 | 10,177 | 5,177 | 4,206 | 9,383 | 19,560 | 13 |
| Total ... | 30,437 | 22,026 | 52,463 | 22,319 | 17,573 | 39,892 | 92,355 | 10·5 |

According to the last census of these Provinces, the total population of the District was 862,000, so that under the present grievous pressure about 10½ per cent of the people have left their homes. A considerable part of this emigration flowed doubtless into our own Districts, perhaps one-third of the whole was so disposed of. But from local accounts the remainder took the general direction towards Central India, and has been temporarily absorbed there. There were no local works in the Muttra District, or any other means employed to check the tendency to emigration, and the movement may be regarded as purely spontaneous. In other Districts of the Western Section, considerable

efforts were made to find temporary employment for the people on the spot. The ratio of out-flow there was therefore probably a good deal less. But still that out-flow by general agreement of authorities was considerable, and would probably not be over-estimated at 3 or 4 per cent on the total population of the affected Districts, or in round numbers about 80,000, of which more than one-half was likely to be a mere interior movement.

Again Meerut and Allyghur may be taken as types of Districts in the Central Section of the Famine Tract, where extensive areas of irrigation or numerous relief works or other means of local employment greatly checked the tendency to emigration beyond the District. The following Return has been supplied to me by the kindness of Mr. Sapte, the Magistrate of the District, and though it is accompanied by a special warning that it is to be received with caution, it may be taken as a rough approximation to the truth :—

*STATEMENT of Emigration from the Meerut District up to April,* 1861.

| Name of Division or Tesheelee. | Number of persons emigrated. | Percentage on Total population. |
|---|---|---|
| Meerut ... ... ... ... | 4,729 | 2 |
| Sirdhanah ... ... ... ... | 4,000 | 3 |
| Haupper ... ... ... ... | 6,518 | 4 |
| Mowanah ... ... ... ... | 3,500 | 3 |
| Ghazeeabad ... ... ... ... | 6,000 | 3 |
| Total ... | 24,747 | 3 |

I am indebted to Mr. Prinsep, the Magistrate of Allyghur, for the following Statement illustrating the same movement in that District :—

*STATEMENT showing the Emigration from the Allyghur District in* 1860-61.

| Names of Divisions or Tehseelees. | Number of persons who have emigrated. | Percentage on total population. |
|---|---|---|
| Allyghur ... ... ... ... | 5,000 | 2 |
| Secundra Rao ... ... ... | 10,000 | 5 |
| Tuppul ... ... ... ... | 4,000 | 7 |
| Hattrass ... ... ... ... | 7,000 | 3 |
| Akberabad ... ... ... ... | 3,152 | 3 |
| Eglass ... ... ... ... | 10,228 | 8 |
| Attrowlee ... ... ... ... | 7,500 | 4 |
| Khyr ... ... ... ... | 8,656 | 9 |
| Total ... | 55,536 | 5 |

Assuming that the returns from the two Districts were made with equal care, and that consequently, though absolutely they may be somewhat incorrect, yet that they may be relied on for comparative results, it would appear that

the special relief works in the Meerut District have reduced the extent of emigration by about 2 per cent on the total population. Excepting as regards these works, the general condition of the two Districts was pretty much the same. Both have the Railway in progress through them, and both have canals and considerable areas of irrigation from wells. The Allyghur emigration is reported to be confined almost exclusively to the laboring classes and artizans, especially Native weavers. Part of it probably flowed towards the Bolundshuhur Branch Works, or the Works in the Meerut District, but most of it no doubt passed beyond the Famine Tract altogether, towards Oude, and our own Southern Districts, or towards Central India.

Knowing the comparative conditions of each of the remaining Districts of the Central Section, I have made out the following Statement, giving a general view of the probable extent of emigration throughout its entire extent within this Section:—

| | | |
|---|---|---|
| Saharunpoor | 2 per cent or about ... ... ... | 16,000 |
| Moozuffernuggur | 3 per cent or about ... ... ... | 20,000 |
| Meerut | 3 per cent or about ... ... ... | 25,000 |
| Bolundshuhur | 4½ per cent or about ... ... ... | 40,000 |
| Allyghur | 5 per cent or about ... ... ... | 55,000 |
| Mynpoorie (part) | ... ... ... ... ... | 3,000 |
| Agra (part) | ... ... ... ... ... | 3,000 |
| Muttra (part) | ... ... ... ... ... | 65,000 |
| | Total ... ... | 253,000 |

Moradabad represents fairly the state of the Eastern Section, and though I have no detailed statement of the emigration from that District, it was estimated for me by the Magistrate, from local inquiries, at about 50,000 in all, or about 4½ per cent on the total population, apparently a fair approximation. This would give for the entire Eastern tract an emigration of—

| | | |
|---|---|---|
| Budaon | about ... ... ... | 45,000 |
| Moradabad | about ... ... ... | 50,000 |
| Bijnore | about ... ... ... | 30,000 |
| | Total ... ... | 125,000 |

of which the whole is probably exterior to the Famine Tract, but all to Districts of our own adjoining it, as those of Rohilkund which have escaped the drought, and Oude.

Summing these results, and taking round numbers, the following would roughly represent the total emigrational movement:—

| | | |
|---|---|---|
| Western Section | about ... ... ... | 120,000 |
| Central Section | about ... ... ... | 255,000 |
| Eastern Section | about ... ... ... | 125,000 |
| | Total ... | 500,000 |

of which about one-tenth has flowed into foreign States, six-tenths into our own Districts outside the Famine Tract, while three-tenths have been from some parts of the tract to others.

With the exception of thus transferring themselves in search of food and work, the people did nothing else for themselves, as in truth they could do nothing else. Our famines are rather famines of work than of food; when work can be had and paid for, food is always forthcoming, but people whose power to labor is annihilated at their homes, can only seek to re-establish it elsewhere, as the working population, both agricultural and artizan, have so largely, and I believe with reference to a great majority of them, so beneficially done. Although prepared for a movement of considerable magnitude, the results, as thus shown, go, I acknowledge, beyond my expectations.

I anticipate no permanent injury however to the Districts whence this emigration has taken place. Temporary injury it must cause of course, as other effects of the drought and dearth do, but a recurrence of regular seasons will be followed by the return of a very large proportion of the wanderers to their own villages. Among them, as I have already said, the number of proprietors of land is comparatively small.

26. A loss that is likely to tell more heavily on the farmers than even the temporary loss of manual labor, is the loss by death of their plough and well bullocks. The scale of their loss has been very large, and it is increasing day by day. From every Section of the Famine Tract I receive intelligence of growing mortality among these animals, and the gravest fears are expressed in consequence. In the Meerut District, it is believed that fully one-half of the farming cattle have already died, and it is known that the rate of mortality is increasing. Such a state of things implies great paralysis of work in the bad tracts, whatever the nature of the season may be, and may well cause very deep anxiety. Ordinarily, the farmer maintains cattle for his wells and ploughs with other work, at the rate of about one pair for each four acres under cultivation, and as the Section of the Meerut District, over which the drought has almost annihilated the crops, is about four-tenths of the whole, the total number of bullocks for farming purposes at the beginning of the pressure was probably about 80,000 pairs. Of these 40,000 pairs, more or less, are reported to have gone, and of the remainder the mortality is now said to be greater than ever. Even the loss believed to have been already sustained however, in this single District, cannot be replaced, but at an outlay of at least 10 lakhs of Rupees, or £100,000.

As very nearly the same general proportion of bad tracts to good runs throughout the Central Section Districts, the loss to the agricultural community there, in cattle only, can scarcely be less, and may possibly be more, than about 50 lakhs, or £500,000.

In the Eastern Section, the loss is probably much less from the large extent of forest or river valley pasturage available, but in the Western

Section, where no such advantages exist, the mortality has been even greater than in the Doab, and the accounts I have received from the Delhi Districts are truly deplorable, as the increasing losses of cattle there are described as causing extensive abandonment of villages by the people. The entire loss therefore from this cause is not likely to fall under about 75 lakhs of Rupees, or £750,000.

These men and the sufferers who still cling to their villages, have fought their fight bravely and well, and I earnestly hope that some help may be given them in such forms as will be most effectual in helping them to help themselves. Nothing could do so more effectually than aid in replacing their lost cattle, or in general help towards the resumption of their usual work, and the Central Relief Committees could not better do their work, in my judgment, than by coming forward to lighten this crushing burden.

27. I have received from a number of the Districts in the Famine Tract comparative statements of their produce in ordinary years, and in 1860-61, of which an abstract only need be given here. Such details are always open to considerable doubt, but without them it is almost impossible to form any definite conception of the actual effect of such a drought as the present, and of the extent to which it has affected the resources of those who have suffered from it. So long as they are accepted for what they are, as roughly approximate estimates, they are useful.

From the Scharunpoor Table it appears that the produce of the land this year has fallen below that of an average year by about one-third, and that the value of this difference may, at the usual prices current in common seasons, be estimated at 15 lakhs of Rupees, or £150,000. This heavy loss has been borne, however, not by the whole District, but by a section of it, only three-tenths of the area, and having less than that proportion of the population. In the remaining seven-tenths the possession of means of irrigation, and the high prices, have made the position of the farmer usually a profitable and prosperous one.

The Moozuffernuggur Statement having been prepared for 1859-60, does not admit of comparison with the others. It illustrates however very clearly the pressure in the year immediately preceding the famine period, and shows that even then the bad parts of the district had lost about two-fifths of their ordinary produce of food grain, representing a loss in money of about 7 lakhs of Rupees, or £70,000, while in the current year the loss in the same section, taken in about half the district, was probably 12 lakhs of Rupees, or £120,000. Of course the same general rule holds in reference to the influence of irrigation and high prices here as elsewhere.

Proportionately the results in Meerut are much the same as those in Scharunpore, the produce lost having been one-third, and the loss concentrated within four-tenths of the total area of the district. Meerut is however larger

and richer, and the money value of its loss would be about 18 lakhs of Rupees, or £180,000.

Allyghur has suffered more severely. From the figures supplied its loss of produce during the famine year has been rather more than four-tenths (4.3) of its average annual production. The money value of the produce thus lost from the drought would be about 25 lakhs of Rupees, or £250,000.

The statements from Boolundshuhur and that part of Muttra which lies Eastward of the Jumna have not yet reached me. The former, situated as it is between Meerut and Allyghur, will most probably show results much the same as they do, and its loss may be assumed at about 12 lakhs of Rupees, or £120,000. Of the five Sub-divisions of Muttra, one only is included by the Collector in the very bad section of the district, although it would appear from the statement of emigration that their loss of population exceeded that of the part of the district excluded in the Western Section of the Famine Tract. For the present I assume that in Eastern Muttra there has been no loss other than that of population.

In the bad part of Mynpoorie rather more than half the area usually cultivated has been thrown out of cultivation during the famine period, and in the like part of Agra the same proportion obtains. The loss of produce in both Districts may safely be estimated at about 11 lakhs of Rupees, or £110,000.

The total loss of agricultural produce in the Central Section may therefore be approximately calculated at from 90 to 100 lakhs of Rupees, or £900,000 to £1,000,000. To a very large section of the people in the Famine Tract the loss has been absolute, as the small patches of cultivation they may have been able to maintain would barely suffice for their own sustenance.

Turning now to the Eastern Section, I find that the actual loss of produce in the Moradabad District is estimated at nearly 4 millions of maunds, an ordinary year's production being about 7 millions, and that of the present year only 3. The numbers indicate a loss of property to the community during the famine period of nearly 40 lakhs of Rupees, but that loss has not fallen wholly on the District, inasmuch as the smaller quantity of produce obtained has been sold at famine prices, and the actual loss is about 12 lakhs, or £120,000. This loss has however been very unequally distributed, and the bad sections have in reality suffered to a much graver extent than this average statement would indicate. Their great loss has been balanced by the greater gains of their neighbours in the better sections, and about 20 lakhs, or £200,000, would probably be a moderate estimate to make of the loss in the aggregate area of the worst section of the district. Bijnour might similarly be taken at 12, and Budaon at 15 lakhs, making the whole loss for the Eastern Section between 45 and 50 lakhs, or from about £450,000 to £500,000.

In the Western Section, and more especially in its Southern parts, I fear the loss will prove to be much greater. I have not yet the means of making any estimate for the part North of Paneeput, but South of Delhi fully two-thirds of the area cultivated in ordinary years has failed this year to yield any produce at all. The loss thus sustained throughout the four Southern districts, or parts of districts, may be computed at about 60 lakhs, or £600,000. The Northern districts will raise this to about £800,000, but I doubt much if this represents the full loss West of the Jumna, as though not so hard pressed as the others, I am aware that in Rohtuk, Hansi, and Hissar serious losses have been caused by the drought.

If the aggregate of these losses throughout the Famine Tract be taken at 3 millions sterling, it will, I believe, be under the truth, and a verification of the approximate accuracy of this estimate may be obtained from independent consideration. The whole remissions of the Government revenue in aid of landed proprietors who have borne the loss just indicated, will amount altogether to about 40 lakhs of Rupees. Assuming the Government revenue to represent, as on the average it does represent, about one-eighth of the gross produce of the land, the above scale of remissions would indicate a loss over the entire Famine Tract of about £3,200,000, or say 3¼ millions sterling. That the truth lies somewhere near these numbers seems therefore a reasonable conclusion, though no claim to strict accuracy can be made for them.

28. There remains but one point further to notice in this section of my Report, and that is the mortality attributable to the famine. For any estimate of this, having even the slightest claim to confidence, there are no materials in existence. No regular records of deaths in Districts have been kept. Those communities who have refused all aid from our relief houses or works, might have died by hundreds without record being made. I have strong personal evidence that in such communities many deaths did occur, but numerical statements of them are not to be had. It is only the deaths of immigrants into Districts, or of people who are without families or friends, that are reported by the Police. Of general vital statistics in India we know nothing to guide us in trying to come to conclusions, and we cannot even test by them the pretensions of such statements as may be made. It is believed that the average rate of mortality among the Native population is high, but what it really is, is quite unknown. Some isolated instances however give painful indications of the mortality that has occasionally prevailed. In the small Sub-division of Bullubghur, in the Delhi District, I find that up to the end of January, 1861, 1,371 men, 778 women, and 704 children, or 2,853 are reported to have died from starvation alone, being about 4 per cent of the entire population. The Superintendent of the Relief Works at Agra informed me that on first starting his works the mortality from starvation used to be about 8 or 9 daily; that this decreased to 6 or 7 after the first

fortnight, and that after a month it had fallen to 4 or 5, at which rate it was almost constant. The works had been in progress about six weeks when I saw them, and the total mortality had been about 500, or about 4 per cent on the strength. In the immediate vicinity of Roorkee, about 200 persons are known to have died from want of food or from disease directly induced by hunger. In the District of Meerut, about 7,000 deaths are reported up to 30th April, but among these are many from other causes than actual starvation. The ordinary mortality of such a District, containing as it does rather over a million of inhabitants, is not likely to be less than from 2,500 to 3,000 monthly, and at a time like the present many deaths from ordinary diseases are not unlikely to be reported by the Police as deaths from starvation. The general condition of the population of the very bad Districts however may be judged of from the following description by Dr. Cutcliffe, Civil Surgeon, of those received into the hospital of the Meerut Relief House. In speaking of their personal state, he says—"they "were one and all starving, and the majority were skeletons from atrophy. "This was not an hospital for sick only, but for starving people attacked by "disease.

"That famine has been prevailing in the District is a fact patent to all. "The people sore-pressed for want of natural aliment endeavoured to support "life by eating wild fruits and vegetables procurable at the expense of toil "in gathering them. They had suffered not only from simple deficiency of "food, but from deficiency of digestible material; from having eaten as sub-"stitutes for proper nutriment vegetables and substances acting injuriously "upon them.

"But they were not only ill nourished and poor blooded. They were "also suffering from great nervous depression both before and after admis-"sion into Hospital; before, from social calamities, loss of homes, of relatives "and of friends, from the dark prospects of the future and the disseverance "from the ties of village life, (ever dear and deep-rooted in the mind of the "rustic,) with its freedom and petty independence; and after, from the con-"viction of their being enclosed in a poor house surrounded by suffering in "every form, to-day perhaps witnessing the death of a child, and expecting "to-morrow that of their wives, and only hoping that their own might soon "follow. From the first to the present time the great mental depression of "the sick in hospital has been most remarkable, and many instances have "occurred of men who refused to take food on the plea that they did not desire "to live, either because their villages had been in part deserted, and their fami-"lies scattered, or that they had lost their children or nearest relations, or "sustained in some way or other some severe trial of the affections, and had "succumbed to despair. Many had wandered about the country after leaving "their villages, and had been exposed to the vicissitudes of the climate, "fainting under the heat of the sun by day, and shivering from the cold by

"night, from which indeed they were ill protected. Many people thus found "were sent into hospital by the Police, and some in the last stages of disease "arrived only to die. From the mortuary abstract of February we find that "out of 162 deaths in that month—

"28 died on the first day of admission.
"28 died on the second day of admission.
"27 died on the third day of admission.
"19 died on the fourth day of admission.
"60 survived over the fourth day, and were affected by and died "subsequently of Chronic Diarrhœa, Dysentery, and Lepra."

"From the abstract of March—

"37 died the day of admission.
"57 died one day after admission.
"80 died two days after admission.
"23 died three days after admission.
"26 died four days after admission.
"41 died five days after admission.
"69 died six days after admission.

"being a total of 333 died within six days of admission, or about three-fourths "of the whole deaths of this month." The total number from January to March was 630; of discharged cured 1,249, with 649 more remaining in hospital.

These are very mournful details, but in the present instance they are somewhat lightened by the thought that deplorable though the mortality has been, yet that twice as many have been recovered from the terrible condition in which they were found than have sunk under it. The most piteous effect of the case seems to me however to be in its suggestiveness. This is a sample brought into light of those sufferings which in many communities are carefully concealed, and which are endured even unto death sooner than that compromise of caste or tribal feelings can be tolerated.

At present then it seems vain to attempt to arrive at the true general mortality. That it has been great no one can doubt who has gone, as it has been my duty to do, from District to District, and has seen the abject wretchedness to which the people of the bad sections were reduced. Long before I read the Medical Report just quoted from, the aspect of deep depression common to all the real sufferers by the famine had struck me everywhere. I am familiar of course with the bearing of Natives generally under suffering, and know them to be often easily borne down by it, but I have never before seen such an aspect of desolate despair as many of these men presented, all of whom, till this great calamity struck them down, had evidently been able to support themselves and their families by honest and independent toil in husbandry or otherwise. Hereafter, when it is possible to examine carefully into village records, a general statement approaching the truth may possibly be prepared, but just now that is impossible.

29. I have now completed the descriptive section of this Report, and have tried to convey to Government, as faithfully and accurately as my capacity permits, the general impressions I have received from the different aspects of the famine. I have endeavoured to define, in so far as the available materials would allow, its boundaries, and to indicate the causes of those broad contrasts that are to be found within them. The systems of relief in action have also been reviewed, and it has been shown that at about 100 separate centres not fewer than 80,000 helpless poor have been fed and otherwise relieved. As these crowds are being constantly changed by the passing onwards of many, at first helpless, to works as they gained strength, and from other causes, it is probable that at least 250,000 persons in all have felt the substantial benefits of this part of the relief system. It has further been shown that through the agency of special works of relief, about 140,000 more have been supplied with the means of subsistence, and to this average number too the succession of persons no doubt makes a sensible addition. By relief houses, relief works, and employment on ordinary public works, not fewer than half a million of the population must have benefitted directly. The spontaneous relief sought in emigration has influenced nearly half a million more, and if account be taken of those tribes who have hitherto struggled on without accepting other relief than that from public demands on account of land revenue, the great body of sufferers can scarcely be less than from 1¼ to 1½ millions.

The expenditure incurred in various forms, including among them the remissions of Government Revenue which have been or will be granted, falls not much short of three-fourths of a million sterling.

The adequacy of the supplies of grain in Districts adjoining the Famine Tract, and in the Tract itself, to meet any demand likely to be made upon them, has been adverted to, and attempts have finally been made to estimate approximately the losses caused to the proprietary communities in the bad Sections of the Tract by the influence of the drought. These have been estimated approximately at about three millions sterling. Heavy however as those losses have been, and most pitiable as are the personal miseries by which they have been aggravated, I believe that should the drought now cease, and favorable rains be had, a strong re-action among the depressed proprietaries will early take place. They will need help, and doubtless help will be given to them with the same generosity as heretofore, but their future condition seems to me now to rest on the cessation or continuance of the drought. Another rainless year will prostrate utterly, I fear, the whole body of the poorer landed proprietors within the bad Sections of the Famine Tract, and the stamp of the calamity will not be effaced through many years of dreary struggle. To anticipate at this time what the future season may be is impossible. All that can be said is, that so far it has been most irregular; that untimely winds are prevailing; that rain is falling out of season, when it is almost useless for agricultural purposes, while it is very mischievous in damaging by premature floods the works of irrigation to which

so large a portion of the people are looking for water. These irregularities may as well indicate however a season of excessive as of defective rain-fall. The season immediately following the great drought of 1837 was one in which rain fell to excess, but these general analogies can give no real assurance, and we can but wait and hope, admitting that for the moment the prospects of the future are justly a subject of very deep anxiety.

30. The remaining section of this report will detail the remedial measures which for future protection against the calamity of drought seem to me to be required in this part of the country. It will deal with questions of irrigation, communications, and fiscal system, some of which assume forms of exceeding complexity and difficulty. The collection of the information necessary to enable me to place them clearly before Government, will take some time, but as much of it is already under preparation, I trust it may not be long before I am able to complete this enquiry.

31. In closing this section, I venture respectfully to express my grateful sense of the facilities given to me in collecting information by the Hon'ble the Lieutenant Governors of the North-Western Provinces and the Punjab, and also to acknowledge the aid received from the Agra Central Committee.

I have the honor to be,

SIR,

Your most obedient servant,

R. BAIRD SMITH, *Colonel,*

*On Special duty.*

# REPORT ON THE FAMINE

OF

# 1860-61.

## SECTION I. A.

SUPPLEMENTARY DESCRIPTIVE DETAILS.

## SECTION II.

REMEDIAL MEASURES.

FROM

COLONEL R. BAIRD SMITH, *C. B.*,
*On Special Duty,*

TO

WILLIAM GREY, ESQUIRE,
*Secy. to the Govt. of India,*
HOME DEPARTMENT.

SIR,

IN continuation of my Report dated the 25th of May last, I have the honor to submit, for the consideration of His Excellency the Governor General in Council, the following statement of the conclusions to which I have been led on the second main subject to which my attention was directed by the orders of Government, dated the 2nd of February last, namely, the remedial measures which it may be expedient to adopt in view to the prevention or essential mitigation of the effects of the occurrence of future seasons of drought.

2. Before taking up this large and important subject, however, I am anxious to place on record a few descriptive details of the Famine Tract belonging to a later date than those included in the First Section of this Report. These details apply to the period between the end of May and the middle of June.

3. During the whole of this time the aspect of the season continued as anomalous as when the first part of my Report was submitted. Heavy and general rain fell throughout the Famine Tract between the 28th of May and the 2nd of June, but from the latter date up to between the 17th and 20th, the weather continued so dry that the cultivators became anxious about their

send 997. The six Districts of the Meerut Division send altogether 17,385, while sixteen Districts of other Divisions send only 798. I have little doubt that like proofs of the strictly local influence of Relief Works will be found on analysis of the returns from those in progress in other Districts, and the point is one of practical value. Bijnore and Umballa being the nearest districts to Saharunpore, not belonging to the same Division, send most,—the former supplying a contingent of 430, the latter of 283. As regards caste by far the largest proportion was from the common village laborers, next came the native weavers, while all other castes were represented by a mere fraction of the whole number.

8. A curious custom was found to have very general prevalence among the work people, whereby a sort of rotation of relief was established. Families whose meagre home resources were not wholly exhausted, adopted the plan of dividing themselves into two sections, one going to the work for a certain time, while the other remained at home. After a time the working section returned to the village to which the whole belonged, and the party hitherto employed there took their turn on the works. In this way, and by a perfectly spontaneous action, the relief was spread over a sensibly larger surface than it could otherwise have covered, and the daily employment of 18,000 people would thus represent the actual relief of probably 25 or 26,000. The trait is a pleasant one too in reference to the people themselves, as it shews they did not willingly sink into even that degree of pauperism implied by the receipt of subsistence wages, but were ready to do the little they still could for themselves.

9. My inspection of the works in the Mohun Pass amply confirmed the general conclusion to which I had been previously led relative to the healthy efficiency and success of the system as administered in the North-Western Provinces. But it also confirmed quite as conclusively my impression of the great and inevitable costliness of works so executed. It was impossible to look at the excessive proportion of worn and wasted frames among the crowds of work people, and to suppose that out of such more than a very small amount of labor could be taken. The work generally was very irregular in form, scarcely admitting of any accuracy of measurement, but I saw no cause to question the correctness of the statement made to me, that the cost of the work was rather more than quadruple than of like work executed under ordinary conditions. The usual rate for such work is Rupees 4 per 1,000 cubic feet. The actual rate, as nearly as it could be estimated, was Rupees 16-2-0. It is clear therefore that of the whole outlay on the road, about one-fourth only is productive in work done, while three-fourths are purely charitable expenditure, the results of which are to be seen only in the slowly growing strength of the masses of people gathered on the works.

10. In paragraph 26 of the First Section I made reference to the peculiar influence of the tracts of country supplied with irrigation from Canals in mitigating the pressure of the Famine on the agricultural classes in bad localities, by affording them temporary means of employment and subsistence in villages belonging to their respective brotherhoods or clans. Enquiries as to

the true extent of this mitigating influence were then in progress, but the results did not reach me in time to be included in the Report. I now annex a Tabular Statement illustrating this interesting point, from careful inquiries made for me by Major Henry Brownlow among 844 villages on the Eastern Jumna Canal. This canal traverses the North-Western Sections of the Districts of Saharunpore, Muzuffurnuggur, and Meerut. It supplies water to about 850 Townships or Villages containing approximately about 350,000 souls.

*STATEMENT illustrating the extent of Immigration from bad parts of the Famine Tract into Canal Villages, from experience on the Eastern Jumna Canal.*

*N. B.*—The larger portion of the Immigration was found to be from parts of the Irrigated Districts immediately adjoining the Canal. The remainder from Districts West of the Jumna such as Umballa, Thanesur, and Delhi.

| Name of the Tribe. | Saharanpore. | | | | | Muzuffurnuggur. | | | | | Meerut. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of Villages. | Number of Immigrant Cultivators. | Number of Field Laborers and Artizans. | Total of Immigrants. | Number of Bullocks. | Number of Villages. | Number of Immigrant Cultivators. | Number of Laborers and Artizans. | Total of Immigrants. | Bullocks. | Number of Villages. | Number of Immigrant Cultivators. | Number of Laborers and Artizans. | Total of Immigrants. | Bullocks. |
| Rajpoots ... | 61 | 509 | 713 | 1,222 | 958 | 36 | 354 | 223 | 577 | 672 | 10 | 16 | 0 | 16 | 4 |
| Goojurs ... | 173 | 923 | 2,356 | 3,279 | 1,867 | 57 | 295 | 470 | 765 | 405 | 49 | 46 | 4 | 50 | 8 |
| Jats ... ... | 5 | 31 | 126 | 157 | 57 | 70 | 290 | 375 | 674 | 500 | 111 | 225 | 325 | 550 | 454 |
| Other Hindoos ... | 72 | 127 | 375 | 502 | 217 | 22 | 55 | 107 | 162 | 73 | 46 | 31 | 30 | 61 | 30 |
| Mahommedans ... | 96 | 188 | 1,067 | 1,255 | 406 | 17 | 141 | 189 | 330 | 297 | 19 | 6 | 0 | 6 | 30 |
| Totals. ... | 407 | 1,778 | 4,637 | 6,415 | 3,705 | 202 | 1,144 | 1,364 | 2,508 | 1,947 | 235 | 324 | 359 | 683 | 526 |

Abstract.

| | | | |
|---|---|---|---|
| Total of Villages | ... | ... | 844 |
| „ Immigrants | ... | ... | 9,606 |
| „ Cattle | ... | ... | 6,178 |

Of the total number of Immigrants 3,246 were cultivators, and the number of Cattle gives very nearly one yoke or pair to each cultivator, thus implying an addition to the ordinary area of culture of about 16,000 acres due to this peculiar movement of the population of the Famine Tract. The largest transfer is seen, as might be expected, among the Rajpoots and Goojurs, whose brotherhoods seem very ready to help each other under difficulties. The influence of an old and long established Canal like that of the Eastern Jumna would naturally however be much more limited than that of new works like the Ganges Canal. In the one case, the irrigable lands of villages are usually pretty nearly all under culture in ordinary years, and no great scope is allowed for additional labor, except in the way of meeting the additional strain which drought always creates in keeping up even the usual extent of cultivation. In the other, large

areas of virgin soil can be brought under the plough, and an immense expansion of the area of cultivation may be made. There is reason to anticipate that the area of land watered from the Ganges Canal within the limits of the Famine Tract has in some localities tripled, and in others quadrupled that of 1859-60, and it is well known that a very large immigration into the villages on that Canal has taken place. Similarly in the Western Section of the Famine Tract the Western Jumna Canals have exercised a like influence. By the aid of the Eastern Jumna Canal results, and from my local knowledge of the other Canal Districts, I am disposed to estimate the total movement thus—

| | | | |
|---|---|---|---|
| Into Eastern Jumna Canal villages about | ... | ... | 10,000 |
| Into Ganges Canal villages „ | ... | ... | 50,000 |
| Into Western Jumna Canal villages „ | ... | ... | 20,000 |
| | | Total ... | 80,000 |

Of this total about ⅗ths would be cultivators, each bringing with him one yoke of oxen for the plough, thus giving about 48,000 men and 96,000 cattle. To appreciate the full effect of the mitigating influence thus developed, it is necessary to bear in mind that at least one-half of the Immigrants would bring with them into these places of refuge their wives and children. Assuming the average number of such families to be four, we have an aggregate of about 160,000 souls thus sheltered and protected against the worst effects of the Famine. But for the existence of these fruitful Canal Tracts which run through the Famine Districts, as rods of iron run through tottering buildings, bonding and strengthening the community, these 160,000 people must have been supported by charity, and supposing this necessity to have existed from January to September 1861, it will be found that upwards of 25 lakhs of Rupees must have been spent for the purpose. Not only has this quarter of a million been saved, but the agricultural produce of the good parts of the Famine Tract has been largely increased, and a sensible influence has been exerted on the general market by the additional quantity of grain, not less than 1½ millions of maunds in the aggregate, and worth from 30 to 35 lakhs of Rupees, which has been thus thrown into it. These details will, I trust, give some more definite views of the beneficial influence of the immigration into the Canal Tracts than I was able to supply at the time the first part of this report was closed.

11. I may further add some new information illustrating the comparative intensity of the Famine in the Central and Western Sections of the Tract. I have recently received from Mr. Colledge, Officiating Collector of Bolundshuhur, a return evidently compiled with much care, showing the effects of the Famine in that District. It indicates that the area of cultivation has decreased by about 2-5ths, and the gross produce by more than one half; that the loss of cattle rises to 99,777 head; that the emigration reaches 48,604, being very nearly 7 per cent of the entire population; that the mortality ascertained to be traceable to the Famine is 24,708, or about 3½ per cent of the

population, and I am inclined to place considerable confidence in these results from knowing that there is scarcely a single village in the worst parts of this District which has not been visited by Mr. Colledge personally. The results agree within reasonable limits of error with those given in paragraph 25 of the First Part, but they leave an impression of greater intensity of suffering in the Bolundshuhur District than had been previously received. This is the only instance in which an attempt has been made to ascertain the true total mortality in a District of the Central Section of the Famine Tract. The result is very saddening, for it would indicate that up to the present time, and notwithstanding all the large and liberal efforts of the Government and the community, not fewer than from 80 to 90,000 human beings must have perished of hunger, or diseases induced by hunger within the limits of the Central Section alone. I have frequently been told by District Officers, that while they could not attempt to fix any limit for the mortality, they were satisfied it had been great, and as the above estimate of it takes only 2 per cent of the total population of the Tract as its basis, the result certainly tends to confirm strongly their convictions on this point.

But in the Western Section there are equally strong indications of that heavier pressure to which all previous evidence bore testimony. When at Delhi on the 11th of June, I was allowed by the kindness of Colonel C. Brown, the Commissioner of the Division, to inspect a number of very detailed returns of the suffering Districts then in course of preparation. The most instructive among them was that of the territory of Bullumghur, of which every part had been examined by the Assistant Commissioner, and the results embodied in a report, from which I gathered the following particulars. The total area of the District is given as 125,000* acres, of which 87,500 acres are ready for cultivation. The number of wells fit for use is 1,064, but the total number of cattle left alive in the District, as ascertained by personal inquiry in each village, is only 2,678 yoke.† A District reasonably well stocked with cattle for agricultural purposes has one yoke for each five or six acres of cultivation, including therein the ordinary proportions of irrigated and unirrigated land. On this standard the cultivators in Bullumghur will find it impracticable to bring more than from 14,000 to 20,000 out of 87,000 acres under crop, and to admit of their cultivating

† To those who care about such inquiries it may be interesting to see the proportions between extent of cultivation and cattle under favorable circumstances and in a thriving District.

The following details are from actual enumeration by the Collector of Mynpoorie, and apply to the year 1850-51, when the District was in a high state of prosperity.

| | Acres. |
|---|---|
| Area of cultivation ... ... ... ... | 677,630 |
| | No. |
| Bullocks and Buffaloes used for the Plough, Wells, and Draught ... ... ... ... ... | 231,678 |
| Cows ... ... ... ... ... | 239,681 |
| Miscellaneous—Horses, Mares, Donkeys, Camels, &c.,... | 22,997 |

The above allows one yoke or Oxen to each 5 or 6 acres of actual cultivation.

I give like details for the District of Muttra at a much earlier period, having been collected by Captain R. Wroughton, of the Survey Department, in 1835.

| | |
|---|---|
| Total area of cultivation... ... ... ... | 811,121 |
| Cattle for the Plough and Wells ... ... ... | 98,283 |
| Miscellaneous ... ... ... ... | 10,401 |
| Proportion of cultivation to each yoke of Oxen | 16 acres. |

This proportion must have been much increased by the great mortality among the cattle in 1837-38, but in comparing the state of things in 1835 with those of 1850, a marked growth of agricultural property in this form is unmistakeably indicated.

* The land measures are given in the Report in Beegahs without specification of the contents of the Beegah used. I have taken it to be the standard Beegah of 55 yards square, or ⅝ths of an acre.

their usual breadth of land it would be necessary to provide them with about 15,000 yoke of cattle in addition to their actual supply, at a cost of not less than about 2½ lakhs of Rupees! This is of course quite out of the question, but the Assistant Commissioner's data have been taken, and worked out with the view of illustrating the reality and the serious extent of the paralysis to agricultural effort produced by the enormous loss of life among the farm stock. Neither Bullumghur however nor any other Districts under like conditions can possibly recover its ordinary status until this stock has been replaced, and help towards such replacement to be effective should evidently be liberal and prompt. At the present moment the amount appropriated to the entire Delhi Division containing five Districts, in all of which there has been much loss in this way, while in three out of the five the loss has been excessive, is only Rupees 50,000. To produce any sensible effect in restoring the usual standard of culture, this sum must be materially increased, and I have no doubt the question has already occupied the attention of the Lahore Committee.

12. The number of deaths attributable to the Famine in Bullumghur to the 1st of June, is stated to be 4,296, and as the population of the Districts prior to the drought was in round numbers 50,000, the rate of mortality is 8½ per cent. I am afraid a ratio approaching to this runs through by far the larger portion of the Southern half of the Section of the Famine Tract now under notice. The emigration is given as 5,263 or 10½ per cent of the entire population. By death and emigration therefore 19 per cent of the people have disappeared. The number daily fed or otherwise relieved amounted in June last to 7,667, being nearly 20 per cent of the population then left in the District. These are the elements of a deplorable picture, but so carefully and laboriously had they been collected that I could not reasonably question their general accuracy. There are no marked distinctions between the condition of Bullumghur and that of the adjoining parts of the Delhi, Goorgaon and Muttra Districts, unless it be that Bullumghur having early attracted notice, and being easily accessible from the City of Delhi, had been assisted by a most liberal and timely expenditure. If it be taken therefore as a type of the very bad parts of the Western Section, it abundantly confirms the conclusion previously arrived at, that on this Section the pressure of the calamity has been heaviest of all. A Relief expenditure of Rupees 10,000 monthly, with special provision for the purchase of seed grain, had been applied for on behalf of Bullumghur, and such aid continued till the autumn crop has been reaped, will doubtless do much to mitigate even such suffering as the preceding details indicate.

13. In the City of Delhi I found that the helpless poor receiving daily food still numbered on the 12th of June about 10,000 in all. The impressions I had received of the manner in which Relief was administered here, on my first visit in March were somewhat unfavorable, but having reason to know that the imperfections, mainly due to the magnitude and novelty of the operations, were being steadily corrected by the Local Committee, the matter was not one calling for

any special notice, and I refer to it now only to say that on this second visit I did not see in the great Relief House at the Eedgah containing about 8,000 sufferers, a single case to which any objection could have been taken. No more pitiable mass of human misery was ever before seen by me than was there gathered together, and the sight was the more sad from the crowd being formed chiefly of widows and children.

14. It is probable that about the middle of June, the suffering from the Famine had reached its highest intensity. The reports from every District then told the same tale of daily increasing crowds of starving people flocking to the Relief Houses or Works, and the demands from the various Local Committees for additional means to meet this growing pressure were many and earnest. In the middle of May, the total number of helpless poor in the Famine Tract had been estimated by me from the best materials I could procure at about 80,000. A like estimate made in the middle of June raised the number to about 140,000. The abundant rain fall between the 17th to 20th would probably check the extension of the misery, and in some degree diminish the number of sufferers by creating some demand for labor in the usual farming work of the season. But even, under the most favorable circumstances, I can see no safe grounds on which to anticipate any very marked diminution of the general pressure until after the autumn harvest has been secured, and its produce has influenced the markets. I would most earnestly deprecate any abrupt suspension of the Relief measures at present in action, not only because of the present suffering that may be caused thereby, but even more because of the certain protraction of future suffering that will be the consequence of prematurely withholding succour from people whose physical strength has been so grievously reduced, and whose personal resources have been so nearly annihilated as those of the inhabitants of the bad parts of the Famine Tract have been.

15. Should this view appear to be sound, the special Relief Works in progress at the exclusive expense of Government would of course be continued till the necessity for them ceased. But it may perhaps be of some interest to conclude this Supplementary Section of descriptive details by giving as definite a view as present information will permit of the means available to support the Relief operations conducted by the various Local Committees in the North-Western Provinces and the Punjab. It is not practicable of course to make any statement of this kind entirely reliable, and many contingencies impossible to foresee may yet arise to derange the estimates as now worked out. But for such possibilities due allowance will no doubt be made, and I believe that the comparison of probable demands and resources may be useful both to the Government and the community generally.

16. To this end I assume that no great diminution of the strain on the means of the Committees can take place before the beginning of October next, which of necessity implies a favorable rainy season. I make some allowance however for the influence of such a season in creating a demand for labor, and

taking June as the month of maximum pressure, the following gradation of the helpless poor is assumed for the intermediate months :—

| | | | | |
|---|---|---|---|---|
| In June number fed daily | ... | ... | ... | 140,000 |
| In July „ „ | ... | ... | ... | 130,000 |
| In August „ „ | ... | ... | ... | 120,000 |
| In September „ „ | ... | ... | ... | 100,000 |

At the actual subsistence rates, as obtained from four months' experience the maintenance of these people, taking an average for men, women, and children, would be about Rupees 1-6 or 2*s.* 9*d.* monthly. The total expenditure on that scale from 1st June to 1st October, would amount to Rupees 6,73,750.

From the beginning of October it is assumed that the expenditure would be designedly but cautiously contracted, and the following scale would perhaps be roughly appropriate. The expenditure in September being Rupees 1,37,500

| | | | | | |
|---|---|---|---|---|---|
| In October reduce by | ... | ... | ... | 25 | per cent |
| In November „ | ... | ... | ... | 50 | „ |
| In December „ | ... | ... | ... | 65 | „ |
| In January „ | ... | ... | ... | 85 | „ |

when probably the necessity for further expenditure would virtually cease. The total outlay thus anticipated would amount in an even sum to Rupees 2,40,000

Thus then it may be expected that the entire cost of supporting the helpless poor through the agency of the Local Committees will amount to (Rupees (6,73,750 × 2,40,000 =) 9,13,750, or say in round numbers so as to allow for contingencies 9½ lakhs of Rupees or £95,000.

In addition however to this demand, a second will arise from the action of Central Committees at Agra and Lahore in meeting the excessive pressure on the poorer agricultural classes, who though not crushed down into utter pauperism, are yet wholly unable to procure either the cattle or the seed grain essential to their preservation from that condition. To aid these the Committees have already made assignments of funds as follow :—

| | | | | |
|---|---|---|---|---|
| In N. W. Provinces about | ... | ... | ... | 4 lakhs |
| In the Punjab about | ... | ... | ... | 1½ „ |
| Total | | | ... | 5½ „ |

On grounds which will be readily understood by reference to paragraph 11, I believe the amount for the present objects ought to be increased in the Punjab, and the entire expenditure will not, I believe, be less than Rupees 7,00,000, or £70,000.

There is yet a third demand on the resources of the Central Committees, the cogency of which few will be inclined to question. It is some permanent provision for the orphans of various ages who are sure to be left dependant on charity for support when the Famine has passed away. At present the Committees have taken no final action relative to these children, because it often happens that

their parents reclaim them when they are in circumstances to support them. Allowing for such cases, and also for the reception of considerable numbers by respectable Hindoo or Mahomedan families, as is a common custom in times like this, there will still remain a large, though at present an unknown, number to be permanently provided for and reputably brought up. The Christian community will probably not permit their whole support to be a charge on the means of the Central Committees, and the practical course adopted will most likely be to grant a liberal donation from the Committies' funds to each of the Orphanages into which the children may be distributed, and to invest the same under proper conditions for their benefit. For this purpose I suppose that Rupees 2,00,000 or £20,000 would suffice.

Summing up these probable demands we have—

| | | | | | |
|---|---|---|---|---|---|
| Expenditure for the helpless poor about | ... | Rupees | 9,50,000 | or | £95,000 |
| Ditto in aid of the poorer agricultural classes for seed, grain and cattle | ... ... | „ | 7,00,000 | or | 70,000 |
| Ditto in aid of the Orphanages | ... ... | „ | 2,00,000 | or | 20,000 |
| Total demands | ... | Rupees | 18,50,000 | or | £185,000 |

Turning now to the resources available to meet the above demands, the first is the amount of local subscriptions and donations with the equivalent of those contributed by the Government. I have found considerable difficulty in the present condition of the accounts of such receipts in estimating them accurately, but I think they may be taken in the aggregate at about Rupees 50,000 per mensem up to the 1st October next, after which they may be expected to fall off in some such proportion as will govern the demand for them. On this basis the total amount will probably be about Rupees 3,00,000 or £30,000.

The means of the Committees in June may be approximately estimated in round numbers as follows:—

| | | | |
|---|---|---|---|
| Balance of the Calcutta Committee | ... ... | Rupees | 5,00,000 |
| ditto of the Agra Committee ... | ... ... | „ | 8,00,000 |
| ditto of the Lahore Committee | ... ... | „ | 3,00,000 |
| Special Remittances available when required | ... | „ | 1,30,000 |
| ADD— | | | |
| Possible Receipts from various sources between the present time and the beginning of 1862, say | ... | „ | 50,000 |
| Total Resources... | | Rupees | 17,80,000 |

About 17¾ lakhs may therefore be taken as a tolerably near estimate of the means of the Committees available to meet prospective demands. The comparison of the two stands thus—

| | | | | | |
|---|---|---|---|---|---|
| Probable demands | ... ... | Rupees | 18,50,000 | or | £185,000 |
| Probable means | ... ... | „ | 17,80,000 | or | £178,000 |
| Deficit | ... | Rupees | 70,000 | or | £7,000 |

As I have already said so many modifying circumstances may possibly develope themselves during the further progress of the Famine that either the demands or the means or both may assume unforeseen aspects. I do not anticipate any actual deficit, but I am sure that even if the latter rains of the season—and it is their character which will finally determine the cessation or continuance of the Famine—should prove as favorable as could be desired, nothing stronger can be said of the present financial position of the Committees than that it is a healthy one, and promises to enable them to carry on their special Relief operations without injurious or abrupt contraction. It promises no more than this however, and it may even be that they shall be compelled hereafter to seek some further though I hope very slight assistance.

17. Finding that a considerable time must elapse before certain Returns from the Irrigation Department required for the second part of my Report could be supplied, and having completed all needful personal inquiries, I quitted the Famine Tract finally on the 13th of June, and proceeding towards Calcutta I reached that place on the 23rd of that month.

18. Having now submitted these details, I pass on to the main subject of this Section of my Report, namely, the protective measures it may be expedient to adopt with the view of mitigating the effects of future seasons of drought.

19. My instructions on this branch of the subject are contained in paragraphs 6 and 7 of your letter No. 221, dated the 2nd of February last, and for convenience of reference I place them here.

"6. A further and a very important point to which Government would wish your enquiries to be directed, is the extent to which it may be practicable and wise to push forward works of irrigation in the Upper Provinces, with the view of giving the means of fertilizing a larger area, and thus making more effectual provision against the recurrence of future seasons of drought.

7. The President in Council does not think it necessary to do more than indicate thus briefly the leading points to which your attention will be given. In going through the large area of country which you will necessarily traverse, other points bearing more or less directly on the general prosperity or otherwise of the people will doubtless present themselves to you, and the Government will be very glad to receive a communication of your views upon any question which you think can be usefully noticed."

The latitude of enquiry thus enjoined is indeed almost a necessity to the comprehensive examination of the vital question of remedial measures, since there is no important institution or agency which has influenced, or may now be influencing, the growth and progress of Native society with which it is not more or less intimately interwoven. The limitation of the enquiries concerning it to the practicable and prudent extension of works of irrigation must have excluded reference to other agencies, even more influential, because much more universal in their action, on the well-being of the people. I have therefore gratefully used the permission allowed me to include in this enquiry such

subjects other than that of Irrigation, as have seemed to me to fulfil the conditions prescribed in the foregoing instructions. At the same time it has been necessary to avoid too great an expansion of the enquiries, and my attention has therefore been mainly concentrated on the three following and most important elements of the general question :—

1*st.*—On the Land Revenue Settlement as connected with Famines.

2*nd.*—On the Irrigation System in general in the like relation.

3*rd.*—On the System of Internal Communication.

20. The geographical limits within which my remarks are designed to be applicable are—

1*st.*—The Central and Eastern Sections of the Famine Tract as previously defined in Part I of this Report, but extended in the former case so as to include the whole of the Allahabad Division East of the River Jumna with the Benares Division, and in the latter, so as to include the entire Rohilkund Division. The common characteristic of the various Districts constituting this great Sub-Divisional tract is that all are under Long Settlements of the Government Demand on the land for revenue, for periods varying from 20 to 30 years.

2*nd.*—The Western Section of the Famine Tract extended so as to include all the Agra Division lying West of the River Jumna, being part of the North-West Provinces; the Hissar, Delhi, and Cis-Sutlej Divisions of the Punjab. In this Sub-Division the rule regarding Land Revenue Settlement is not uniform. The Demand is fixed for long terms in the Districts that now form, or recently formed, part of the North-Western Provinces, but in some of the Punjab Districts the settlements are temporary, and are occasionally of such character that to fix them for long terms as they stand would be very inexpedient, as it has been clearly shown that they are heavier than can be borne. Revisions have been needful accordingly, in such instances, all tending to a lightening of the Government Demand, but it would be premature to regard them otherwise at present than as in a state of transition and progressive adjustment.

21. Chart No. VII has been prepared to illustrate the Sub-Divisional distribution thus indicated. The districts settled for long terms are all marked by the same colour, and the districts which may be called transitional are similarly distinguished, so that the characteristic features of the Sub-Divisions can be recognized at a glance.

22. Over the whole of this expanded area, and indeed in some instances far beyond it, Famines of variable intensity have ranged within historic periods, devastating sometimes one section of it, sometimes another, but very rarely indeed involving the whole in one common intensity of suffering. The records of these remoter calamities are misty and indefinite. They

tell of vast mortality, of tracts of great extent left without inhabitants, of destructive pestilences following in the track of the Famines, and so on, but beyond these superficial signs they show no effort to penetrate. We learn a little now and then of the means of mitigation attempted, and we almost uniformly find that up to a time very recent indeed, the calamities due to natural causes received some of their worst aggravations from the blunders of well meaning men. Violent interferences with the course of trade; persecutions of the traders; fixing maximum selling prices for the grain; constituting the Government the great grain dealer of the country, and endeavouring to fulfil this impossible function through a mechanism equally impossible; and in brief an entire absence of all recognition of the truth, that the order of nature, if it occasionally produces dire sufferings, does also provide generally the most effective means for their mitigation. As it is scarcely yet recognised universally among ourselves, however, that in the natural laws of trade left to their free action, or if helped at all, helped only by the removal of obstructions, one of the best and surest aids against Famines is to be found, the strange devices spoken of in these ancient records, (and of which some substantial memorials remain among us even to this day,) are not much to be wondered at. They were on the level of the knowledge of the times, and as the latest of the older series of great Famines, that namely of 1783, followed only by a few years, the first dawn of the revolution of thought on such questions produced ultimately by the publication of Adam Smith's "Wealth of Nations" in 1776, it could scarcely have been expected that those who had to meet it, even though Warren Hastings himself were among them, should do so on principles far in advance of contemporary opinion and experience.

23. I need not dwell much therefore on the details of the Famines that have left so little of useful knowledge behind them. But there are one or two points deserving of notice as having had some influence on the present occasion. It was from an examination of the list of these Droughts that the impression of their having a rough cyclism or recurring period was derived, and that the possibility of the great irregularities of season noticeable in 1858, 1859 and 1860, terminating in a Famine, was suggested. Traces more or less complete have been found of Droughts causing serious scarcities or actual famines in the following years:—

| | Intervals. Years | | Intervals. Years |
|---|---|---|---|
| 1733 | | 1803 | 13 |
| 1744 | 11 | 1813 | 10 |
| 1752 | 8 | 1819 | 6 |
| 1770 | 18 | 1826 | 7 |
| 1783 | 13 | 1833 | 7 |
| 1790 | 7 | 1837 | 4 |
| | | 1861 | 24 |

24. Among these by far the most destructive were in the following years :—

| | Intervals. Years | | Intervals. Years |
|---|---|---|---|
| 1770 | | 1819 | 16 |
| 1783 | 13 | 1837 | 18 |
| 1803 | 20 | 1861 | 24 |

Of this series it seems probable from all historical accounts that the Famine of 1770* * was the most intense that India ever experienced. Quoting from a letter of the Governor and Council of Bengal, under date the 3rd November, 1772, Mill describes* it as "one of the most dreadful of those Famines which so often afflict the Provinces of India; a calamity by which more than a third † of the inhabitants of Bengal were computed to have been destroyed." The following statement of prices of food grains in Bengal in that disastrous year will tend to confirm the general impression of the sad sufferings which must have prevailed. These prices have been taken from an Official statement prepared from authentic documents by the Fiscal of Chinsurah of the prices of grain and a few other articles at that station between the years 1700 and 1813.‡

* History of British India, Volume III, page 486.

† Other authorities give the smaller proportion of one-fifth, but either conveys a sufficiently strong impression of the magnitude of the calamity.

‡ Gleanings in Science, Volume I, page 369, —1829.
Table showing the market price of grain, &c., in lower Bengal from the year 1700 to 1813, extracted from authentic documents of one month in each year, for which generally the month of August was selected. Drawn up by G. Herklotts, Esquire, Fiscal of Chinsurah.
*(See Appendix I.)*

Market prices of the following articles in Lower Bengal in 1770 :—

| | | | |
|---|---|---|---|
| Rice, best sort | ... ... | 3 | seers per Rupee. |
| Ditto, coarse | ... ... | 3¼ | " |
| Inferior grains. | ... ... | 4½ | " |
| Dal, (pulse) | ... ... | 4 | " |
| Wheat | ... ... | 4½ | " |
| Ghee, (clarified butter) | ... | 20 | Rupees per maund. |

The ordinary prices of the above articles about the same period were—

| | | | | |
|---|---|---|---|---|
| Rice, best sort | ... ... | about | 28 | seers per Rupee. |
| Ditto, coarse | ... ... | " | 40 | " |
| Inferior grains | ... ... | " | 45 | " |
| Dal | ... ... | " | 30 | " |
| Wheat | ... | " | 26 | " |
| Ghee | ... ... | " | 5 | Rupees per maund. |

The staple food of the people, the common rice of the country, was therefore enhanced in 1770 to more than twelve-fold its common price, a proportion far exceeding that in any other Famines of which I have been able to find traces tolerably reliable.

25. The next great famine in 1783 was of unusually large extent. It is described as having stretched from Bengal and Orissa Northward to Lahore. But I cannot find that the current price of grain ever rose higher than from 10 to 12 seers per Rupee. When recently in Cawnpore, I had some

* * It is said that the Famine of 1770 was due not to Drought but to excess of rain-fall. I have not found any distinct information on the point however.

conversation regarding it with a very old Native merchant, a man who said he believed he was 90 years of age, and was at any rate old enough at the time of this Famine to have retained some personal recollections of it, strengthened no doubt afterwards by the traditions relating to it which even still linger among the Native community. He had recollections also of all the other subsequent Famines specified in the second list given in para. 24, but among the entire series he ranked that of 1783 as the most severe, even more so than that of 1837-38, and much more so than that of 1860-61. The old man's faculties seemed scarcely impaired, and his benevolence of character was shown by the fact that he was at the time I saw him supporting at his sole cost 50 or 60 starving people. He informed me that the prices of grain in 1860-61 had been higher for a longer time than he recollected in any previous Famine, and the fact, which my own further enquiries tend to confirm, is one deserving of notice for reasons which will be better explained hereafter.

26. The Drought of 1803 seems to have been confined to the North-Western Provinces. Its effects however were felt in combination with the ravages of war, and the sufferings of the people are described as having been very cruel. The country had only just come into our hands, but large remissions of the Government Demand were at once made to mitigate the great pressure.* The state of things due to the Drought is thus alluded to in an old manuscript Account of the District of Futteghur to which I have had access:—

"The first settlement of the revenue of this District after the cession (by the Government of Oude) was made by Messrs. Mercer and Russell, and extended from September 1802 to September 1805, or for three years at a total amount of Rupees 29,34,785 (or £293,478), from which however must be deducted Rupees 16,42,106 (£164,210) on account of remissions, charges, &c., having a net credit to Government of Rupees 12,92,679 (£129,267), or an average of Rupees 4,30,890 (£43,089) per annum. * * * *

"In the very second year of this settlement however a drought occurred, which was severely felt by the landed proprietors whose distress induced Mr. Russell to recommend the suspension of the Government demand unrealised at the time amounting to Rupees 1,46,000. The season of 1803 was indeed a very calamitous one, and great scarcity prevailed. The Rubbee (or Spring) crops were destroyed by hailstorms, and the prospects of the unhappy agriculturists were most deplorable. The Government ordered the importation of grain from Bengal, and to encourage the exportation from thence, a bounty was allowed on each description of grain."

The table of prices of grain in Bengal formerly quoted shows that in 1803 ordinary Rice was selling in that Province at 40* and wheat at 44* seers per

---

Equivalent to about 14 Shillings a Quarter for Rice, and 12-6 for wheat.

Rupee, but the results of the well intended action of the Government are not farther alluded to.

Additional remissions were subsequently allowed to a large amount on account of "the injury to crops caused by the incursion of Jeswunt Rao Holkar and of the Rebel Nazir Ally Khan, from the march of the army under His Excellency the Commander-in-Chief in pursuit of Holkar, and from farther damage by hail."* It is rarely indeed that even so much information as the above regarding calamities affecting at dates so remote only the condition of the people can be procured. Traces of the famine of 1803 might probably have been followed through the records of other Districts affected by it, but as these have all so far as I know been lost, we must be content with the fragmentary notice just given.

27. Regarding the Drought of 1818-19, I have been able to learn even less than of that of 1803. I can only judge of its severity from the references made to it by intelligent and apparently reliable Native informants who invariably placed it among the very bad years.†

The price of wheat at Agra in this year was as high as 17 seers per Rupee, and at Allyghur 19 seers.

---

* As a curious record of the times, I reproduce from the *Asiatic Annual Register* for 1804 the original Proclamation above referred to.

"FORT WILLIAM, *the 27th Sept.* 1803.

PROCLAMATION

By His Excellency the Most Noble the Governor General in Council.

INFORMATION having been received that the price of grain has been considerably enhanced in the Province of Benares, and in the Provinces ceded to the Hon'ble Company by His Excellency the Nawab Ouzeer, His Excellency the Most Noble the Governor General in Council, with the view of encouraging the importation of grain into those Provinces from the Province of Bengal, has been pleased to direct that a bounty shall be paid on all grains imported at the City of Benares or Allahabad from the Province of Bengal, within three months, and at Cawnpore or Futtehghur within four months from the date of this Proclamation.

The following is the rate of bounty which will be paid on the different kinds of grain at each of the abovementioned stations on all grain, *wheat* and barley excepted:—

| | | Per 100 Mds. |
|---|---|---|
| At Benares ... ... ... ... ... | Rs. | 15 |
| At Allahabad ... ... ... ... ... | ,, | 19 |
| At Cawnpore ... ... ... ... ... | ,, | 23 |
| At Futtehghur ... ... ... ... ... | ,, | 27 |
| On Wheat and Barley per 100 maunds. | | |
| At Benares ... ... ... ... ... | Rs. | 17 |
| At Allahabad ... ... ... ... ... | ,, | 22 |
| At Cawnpore ... ... ... ... ... | ,, | 24 |
| At Futtehghur ... ... ... ... ... | ,, | 31 |

The bounty to which persons importing grain at the abovementioned places may be entitled, will be paid at Benares, Allahabad, and Cawnpore, by the Collectors of those Districts respectively, and at Futtehghur by the Agent to the Governor General at Furruckabad. (Details of no interest relative to checks on Importers follow.)

Persons importing grain into the Province of Benares or into the ceded Provinces from the Province of Bengal, in consequence of this Proclamation, will be at liberty to dispose of their grain at such price and in such manner as they may judge proper."

While these efforts were being made to bring grain from Bengal to points varying from 5 to 600 miles distant, it seems either to have been unknown to the Government, or internal communication was so hopelessly impracticable, that the knowledge was useless, that in the immediately adjoining Province of Rohilkund grain was as abundant and fully one-third cheaper than in Bengal. I find that it was so however as in July, 1804, wheat and barley were selling in Bareilly at 60 seers per Rupee, whereas in Bengal the former was selling at 44 only. The distance from Futtehghur is about 70 miles, and the Province generally had had plentiful rains.

† The following Extracts from the *Calcutta Journal* of 1819 indicate a peculiar severity in the cold weather of that year from which the spring crops suffered much:—

"I left Fyzabad (in Oude) on the morning of the 21st of January, 1819. The water was in many places frozen over, and the hoar-frost on the ground had the appearance of a slight fall of snow. The potatoe crops, which on the 16th appeared green and fresh, were now brown and withered. The wheat and barley crops seemed luxuriant. I was told that the appearance was deceitful, and that the spring crops were all destroyed. Arriving at my tent I examined several fields, and not an ear of corn could I find that was not blasted by the frost. The grain, the several species of dál, the peas and the sugar-cane have all shared the same fate. Grain which was selling at the rate of 20 seers on the 20th January, had risen to 16 seers on the 24th, and continues to rise."

"Jounpore, North-Western Provinces—On the 19th January, 1819, the Thermometer was at 30° for an hour and a half after sunrise in every place I tried it, being shaded from the sun. The consequences of this frost are disastrous. About half the wheat and the barley have been destroyed and, the former now sells in Jounpore at 10½ seers (96 Rupees' weight) per Rupee. At Benares the last price current was 21 seers (of 84 Rupees) per Rupee. This excessively high price is in some measure due to the river being unusually shallow this year, which has prevented the larger grain boats from coming to the market."

28. Between 1819 and 1837, there intervened a series of very indifferent seasons of which one, *viz.*, 1833-34 was marked by a partial and within narrow bounds a very severe scarcity. The Famine of 1837-38 was in fact the crisis of five or six years of great climatic irregularity. Such irregularity seems indeed to be a characteristic preliminary sign of a complete suspension of the usual rain fall, and I trace it more or less distinctly through the series of greater Droughts. Before 1770 and 1783, the prices of food grains indicate much disturbance of the ordinary seasons, and prior to 1803 like signs are to be found. 1833 was followed by four years, of which the first and third were of excessive humidity, and the second and fourth of like dryness, till in 1837-38 the usual climax came.

29. Similarly 1858, 1859 and 1860 gave cause to fear from their very abnormal character, that a like climax might be impending in 1861. It was at any rate expedient to give serious attention to so grave a possibility, and to take such precautionary measures against its effects as might be prudent and practicable. The Government of India came to this conclusion, and I confidently believe that the early anticipation of its being possible that a great calamity might have to be provided against, contributed very materially to the prompt and decisive action by which it was met when the time of need came, and by which some of its most pitiable aggravations have been successfully warded off.

30. Reviewing the whole period under notice, we find that in the course of the 91 years that have passed between 1770 and 1861, there have been six Droughts variable in the extent of the areas they have influenced, and in their destructiveness of life and property, but all of most serious importance in their effects on the resources of the Government and the material condition of the people. The average period at which they have recurred is about 15 years, but the coincidence of the actual and average periods is only very roughly approximate, the former ranging from 13 to 23 years. The last of the series shows the longest interval of all, and it is an interval so full of significance and so calculated to throw light on the subject of this Section of my Report that I must try to illustrate it as clearly and explicitly as possible. Before proceeding to do so, I need only add that I have been given to understand that the same rough periodicity in the recurrence of droughts which has been referred to here, has been noticed also in Australia and South America, where they seem to follow each other at average intervals of nine or ten years, and to be occasionally of extreme intensity.

31. That period of climatic disturbance which reached its maximum in the Drought and Famine of 1837-38, was coincident in point of time with the most vital administrative act which ever influenced the material condition of Native Society in the Upper Provinces. From the time of our earliest acquisition of any part of these Provinces up to 1833, our Fiscal System, notwithstanding some improvements on the Native methods which were gradually introduced, had been thoroughly bad. The Assessments were excessive, unequal and unintelligent. Fixity of demand was virtually unknown, and with exception to a small part of

Benares, no Settlements exceeded five years in duration, while a few were annual and many triennial. The Collectors were, as a rule, utterly ignorant of the forms of tenure, and of the complex system of individual rights which was in lively action around them. "Seated in his Office at the principal station," says a most competent authority,* "the Collector was attended by his right hand men, the District Accountants, by whom he was almost entirely guided. As each estate came up in succession, the curt record of previous Settlements was read, and the Fiscal Register for ten years immediately preceding the Cession was inspected. The decision of the proprietary rights in the village rested almost exclusively on the dicta of the District Accountants, and as these were followed by little farther enquiry, it may be imagined that great injustice was thus perpetrated. Then followed the determination of the amount of the revenue. On this point, too, reliance was chiefly placed on the mere estimate of the Native Accountants, checked by the amounts of past collections, and by any other offers of mere farming speculators which might happen to be put forward at the time. Mistakes of course occurred, and re-adjustments had to be made even during the currency of the short leases then granted. Great discontent was naturally created by these blind and summary proceedings among those whose interests had been neglected, or over-ridden by them."

Growing stability under a Government of power such as ours was, gave however a growing value to all rights of property, and it began to dawn more and more clearly on men's minds that they were robbed not only of empty ancestral claims, but of substantial and transferable rights, which were becoming more and more easily transmutable into money as the memories of unsettled times became obscured by the general tranquillity. The earlier forms of redress open to them were worse than useless. Complainants were referred to the Civil Courts, and whatever may be the condition of these Courts now, they work as in the bright light of day in comparison with the obscurity through which, during the first 15 or 20 years after the Cession of these Provinces, they had to grope their way to decisions. No record of rights existed; no knowledge of prevailing tenures was available for their guidance; no standards of reference possessing any authority that commanded respect could be made use of. As the authority already quoted truly says, "they could only make confusion worse confounded, and not only were the errors of the Revenue Department too often confirmed, and repeated in the Courts, but decrees were constantly passed so irreconcilable with truth and justice, that it was absolutely impossible to execute them."

32. So frightful at length became the confusion induced by these causes in the state of landed property, that remedies, whose very violence is a measure of the height to which the evil to be abated had risen, were of necessity adopted. A Judicial Dictatorship was established in 1821, and all public and private transfers of land made within the first seven or eight years after the Cession were subjected to its decision. The expedient had but limited success, though the action of the Commission was vigorous enough. It illustrates their course

---

Settlement of the North-Western Provinces, *Calcutta Review*, Vol. XII.

in one of the Districts which subsequently suffered most from the Famine to mention that in Cawnpore they annulled 185 sales of land for arrears of Public Revenue out of 405 of which they took cognizance, or about 45 per cent of the entire number.

33. Out of these various efforts however there rose gradually a clearer and more practical perception of the true remedies for the deplorable condition of the country. It began to be seen that to assess with equity, knowledge was the first necessity, and that as long as brief Settlements continued to be made without intimate and accurate knowledge of all the main elements affecting the actual condition of the people, so long must blunders of the most pernicious influence be perpetuated. In Mr. Holt Mackenzie's well known Act VII. of 1822 these views found clear and explicit expression. The general principles of a sound Settlement, the objects to be aimed at, the manner in which they should be sought, with other essential points, are to be traced in it with unmistakeable distinctness. There has always been a genial and generous appreciation in the North-Western Provinces of the general wisdom and justice of this scheme, and of the steady growth of accurate information as to the state of the people to which it was the first important step.

34. But from inherent practical defects in the modes of procedure prescribed, and in certain other points, the plan failed in producing satisfactory results. Ten years after its initiation the progress made in Settlements was but nominal. The old record of the Futtehghur District, to which I have previously referred, shows that between 1822 and 1833 only 276 out of 1,164 villages in that District had been assessed under the provisions of the Act. In Futteypore the results were still more notable, only three villages having been settled between 1822 and 1833, and it was generally estimated that something like a century must pass before the whole of the Provinces could be finally settled.

35. This was of course equivalent to a sentence of condemnation on the score of impracticability, and if the plan had been persisted in, the Famine of 1860-61 would have found us with fully three-fourths of the work still to do. Act IX of 1833, however, transformed an unworkable into a perfectly workable scheme, by correcting its errors, simplifying its processes, limiting its range, and supplying for it a comparatively new and special native agency, highly paid and honorably placed, from which much invaluable aid was obtained. In about nine years from the passing of the Act, the whole of the Districts in the 1st Sub-Division shown in Chart No. VII, together with those in the 2nd, formerly belonging to the North-Western Provinces, were settled for periods ranging from 20 to 30 years.

36. It forms of course no part of my present purpose to dwell on any details of the Settlements thus made. For the moment I desire rather to draw attention to the actual condition of the people as influenced by the state of things which the system of 1833 was designed to ameliorate, than to the effects of that system as

developed in after years. It is with this object that I have given the foregoing condensed sketch of the effects of the temporary or summary Settlement System which had prevailed without any material mitigation of its depressing and weakening influences up to the time when Native Society had to endure the terrible shock of the Drought and Famine of 1837-38. To my own mind I confess it appears clear that no misapprehension can be greater than to suppose that the settlement of the Public Demand on the Land is only lightly, or, as some say not at all, connected with the occurrence of Famines. It lies in reality far nearer to the root of the matter, because of its intimate and vital relation to the every day life of the people, and to their growth towards prosperity or towards degradation than any such accessories as Canals or Roads, or the like, important though these unquestionably are. It is no doubt quite true that not the best Settlement System which mortal intellect could devise would cover the skies with clouds, or moisten the earth with rain when the course of nature had established a Drought. But, given the Drought and its consequences, the capacity of the People to resist their destructive influence, is in direct proportion—I would almost say geometrical proportion—to the perfection of the Settlement System under which they are living and growing. That system in the North-Western Provinces prior to 1837-38 was by universal consent a most unsound one, and its direct tendency was to aggravate the grievous pressure which had then to be borne.

37. Nor was the weakness in the social fabric thus generated much relieved at that period by any accessory aids from either Canals of Irrigation or Central lines of Communication, or by interior Roads other than the usual native cart tracks. The great navigable Rivers were there of course, but they were the only lines of easy communication with the Lower and between many parts of the Upper Provinces. The Grand Trunk Road was in its infancy, conceived in plan and in part executed, but only in a very imperfect state. The District Roads now existing are the results of a special appropriation which formed part of the new system of Settlement, and the miserable expedient of compulsory labor for which it was the substitute, had of course been practically useless. The only Canals of Irrigation, which were then in existence, the two drawn from the River Jumna, irrigated scarcely more than 60 or 70,000 acres between them before 1833, and even in 1837-38 their combined effects did not extend over a larger area than about 400,000 acres, which though locally of the highest value, was yet of but limited influence on the Country at large.

38. Speaking in general terms, therefore, Native Society in the North-West had to face the calamity of 1837, debilitated by a Fiscal System that was oppressive and depressing in its influences; and with its agricultural population generally discontented under the extreme confusion into which, by the action of both Revenue and Judicial systems, all their most treasured rights had been thrown. In India we all know very well that, when the agricultural class is weak, the weakness of all other sections of the community is the inevitable consequence. Internal trade was burdened and harassed by cumbersome duties, and carried

on under difficulties of transport which in such a crisis must have been almost paralysing. External commerce had for many years prior to 1833-34 been virtually stagnant. The growth both of Imports and Exports which has now reached such magnificent proportions, had then barely commenced with the removal of the restrictions on the Indian trade in 1833. Reference to the old records of the times shows that while in 1833-34 the entire Export and Import Trade of the Bengal Presidency, which then included the North-Western Provinces and the Delhi Territory, was in even numbers Rupees 7,22,00,000, or £7,220,000, it had been, five years before, or in 1829-30, as high as Rupees 7,72,00,000 or £7,720,000. The intermediate fluctuations, however, are just such as to indicate, as I said before, a state of Trade virtually stagnant. In 1836-37, when the Famine was beginning to tell on the country, the upward movement of the Trade had begun, and in that year the aggregate Imports and Exports were Rupees 11,12,00,000 or £11,120,000, being an increase of nearly four millions Sterling over those of the period ending in 1833-34. Of this increase perhaps about a Million Sterling would fairly represent the share of the North-Western Provinces. We know that now this Trade, which is among the most vivid and certain indications of internal growth, has risen to above three-fold its amount in 1837. Making therefore every reasonable allowance for the intermediate increase of population, the conclusion seems still irresistible, that the material condition of all affected by External, Commerce must have been much lower during the Famine of 1837-38 than during that of 1860-61.

39. These details will, I trust, suffice to give at least a fairly accurate impression of the general condition of the people when the calamity of 1837-38 was imminent. I would now try to give a like impression of the true magnitude and intensity of the calamity itself as a necessary preliminary to a comparison of its effects with those of the existing Famine. And to this and it is primarily necessary to endeavour to define the Geographical limits within which the influence of the Drought of 1837 was felt.

40. In seeking materials for this purpose, I have found great difficulties from the total absence of any connected account of the range of the Drought. It has only been by careful search through all the publications of the time, Newspapers, general and scientific Journals, Revenue Settlement Reports, and such other documents of a like kind as I could discover, that I have been able to bring together a sufficient collection of facts to give a fair representation of the case. Whatever official records may have once existed have now, with rare and unimportant exceptions, disappeared altogether, and from such no help has been obtained. Still from the various sources indicated, much information has been gathered, and though all of it has had to be sifted, and some rejected as manifestly exaggerated or wrong, the general conclusions based upon it are deserving, I believe, of considerable confidence. It is right, however, that the manner in which the materials they rest upon have been obtained should be fully understood.

41. In Chart No. VIII. will be found a representation of the boundaries of the Famine Tract of 1837-38. The area of greatest intensity was unquestionably on this occasion in the Districts of the Lower Doab. North of Allyghur the pressure, though sensibly felt, did not approach to any thing like Famine, and was far inferior to that in the Southern Section of the Tract. The Districts of Agra, Muttra, Etawah, Mynpoorie, Futtehghur, and Cawnpore, were the seats of the extremest misery, and the most pitiable mortality. In Futteypore the suffering was great, and in Allahabad considerable but mitigated. Below Allahabad the pressure was but little if at all felt. Oude generally escaped, and is represented as having furnished some surplus supplies to the Districts West of the Ganges. The Northern Doab including the Districts of Bolundshuhur, Meerut, Muzuffurnuggur, and Saharanpore were then exporting Districts, and sent such surplus produce as they had by the River routes, or by the ordinary Native roads to the Southward. On this point all the testimony of grain merchants from whom I sought information was uniform. Rohilkund suffered severely in parts, but not generally. Then as now, however, some of the Districts on the right bank of the Jumna were cruelly devastated. The worst suffering was in Humeerpore, Agra, and Muttra West of the Jumna, and Delhi. There was also a good deal of pressure in Goorgaon, Panceput, Rohtuk, Hansi, and Hissar; and of these Districts Hissar was the worst.

42. As an index of the cotemporary estimate of the comparative intensity of suffering throughout the Famine Tract, I annex the accompanying list of Remittances* to the different Districts made by the Calcutta Relief Committee :—

| | | | | |
|---|---|---|---|---|
| To Agra | ... | ... | ... | Rs. 27,000 |
| To Cawnpore | ... | ... | ... | „ 19,000 |
| To Etawah | ... | ... | ... | „ 19,000 |
| To Muttra | ... | ... | ... | „ 18,000 |
| To Mynpoorie | ... | ... | ... | „ 16,000 |
| To Humeerpore and Calpee | | ... | ... | „ 13,000 |
| To Futtehghur | ... | ... | ... | „ 8,000 |
| To Banda | ... | ... | ... | „ 8,000 |
| To Allyghur | ... | ... | ... | „ 6,000 |
| To Delhi | ... | ... | ... | „ 4,000 |
| To Futteypore | ... | ... | ... | „ 4,000 |
| To Bolundshuhur | ... | ... | ... | „ 2,000 |
| To Kurnaul | ... | ... | ... | „ 2,000. |

The Committee says briefly "the Famine appears to have been most grievous in the Districts lying along both banks of the Jumna, Muttra, Agra, Etawah, and Humeerpore. The whole District of Mynpoorie and some Sub-Divisions (Pergunnahs) of Cawnpore were equally afflicted. Futtehghur and Allyghur suffered also, but in the latter District the consequent distress appears to have been comparatively small." To other parts of the tract no allusions are made.

* Extracted from the Report of the Committee as published in the *Bengal Hurkaru* of the 23rd July 1838.

43. In further illustration of the same point, I give the following Table of the Annual Revenue of the different Divisions of the North-West Provinces thrown into averages for quinquennial periods, and extending from 10 years prior to the Famine to 10 years after it:—

| Divisions. | From 1827-28 to 1831-32 | From 1832-33 to 1836-37 | From 1837-38 to 1841-42 | From 1842-43 to 1846-47 |
|---|---|---|---|---|
| | Rupees. | Rupees. | Rupees. | Rupees. |
| Meerut ... ... ... ... ... | 52,28,807 | 56,54,624 | 63,81,540 | 69,05,136 |
| Rohilkund ... ... ... ... ... | 64,12,554 | 58,58,664 | 55,18,641 | 63,53,941 |
| Agra ... ... ... ... ... | 70,56,480 | 75,01,686 | 62,55,285 | 70,34,606 |
| Allahabad ... ... ... ... ... | 91,63,217 | 87,87,969 | 75,16,670 | 84,00,698 |
| Benares (Goruckpore and Azimghur only) ... ... | 17,92,438 | 24,43,719 | 29,95,416 | 31,99,065 |
| Delhi ... ... ... ... ... | ... | 27,86,912 | 32,70,727 | ... |

From a study of this Table some clear inferences may be drawn as to the comparative intensity of the general pressure. It is well known that remissions of the Government Demand, especially under prolonged Settlements of the Revenue, are made only in cases of urgent and pressing necessity. Average pressure is presumed to be provided against in the terms of the Settlement and District Officers act under a heavy sense of personal responsibility when they propose large remissions. They now act generally with an intimate, and probably in 1837-38 they also acted with a fair knowledge of the real condition of their people, so that the amount of remission of Public Demand proposed for each District, and the loss of Revenue consequent thereon may be taken as an approximate test of the intensity of the local pressure. So estimated the Agra Division, including the Districts of Agra, Muttra, Etawah, Mynpoorie, and Futtehghur, exhibits results surpassing those of any other Division. The average Annual Revenue of the Division prior to the Famine was in round numbers Rupees 75,02,000 or nearly £750,000. In the five years following the Famine it fell to Rupees 62,55,000 or £625,500, thus showing an annual loss of Rupees 12,47,000 or £124,700, or a total loss in five years of Rupees 62,35,000 or £623,500. Further, however, the lapse of five years by no means obliterated the influence of the Famine on the Revenue of the State. In the following five years the average Annual Revenue was still nearly Rupees 5,00,000 below the standard prior to the Famine, and in those years a farther loss of nearly 25 lakhs or £250,000 took place. At this present time the Revenue continues to show a difference from the above standard of about 3½ lakhs, so that about Rupees 45,50,000 or £455,000 must be added for the loss in the thirteen years intervening between 1846-47 and 1859-60. The stamp of this terrible calamity has, therefore, remained uneffaced in this Division by the lapse of two and twenty years, and the State has received from the Districts forming it less revenue by an aggregate amount of the almost incredible sum of Rupees 1,32,85,000 or

£1,328,500, than it would have done, had it been possible by any expedients to have warded off the catastrophe. The above, it should be noticed, somewhat under-rates the loss, inasmuch as credit is given for increase of Revenue due to Resumptions of Rent-free Lands, Lapses of Estates, and the various miscellaneous items which in the course of 22 years have swollen the apparent Land Revenue. It also somewhat over-rates it from not taking account of reductions of demand due to other causes than the Famine, so that on the whole it is probably not far wrong. It is well that in dealing with measures to remedy calamities so disastrous, some definite conceptions should be formed of the vast interests involved, and few illustrations could be more impressive than this which shows that within a single Division, Agricultural property certainly not less than from 8 to 10½ millions sterling in gross value was entirely annihilated.

44. Nearly equal in order of intensity stands the Allahabad Division including the Districts of Allahabad, Futteypore, Cawnpore, Humeerpore, and Banda. Here the loss in the first five years following the Famine was Rupees 12,70,000, or £127,000 annually, or in all Rupees 63,50,000 or £635,000. In the succeeding five years, however, the loss was sensibly less than in the Agra Division, being Rupees 3,88,000 or £38,800 per annum or in all Rs. 19,40,000 or £194,000. The Division has not yet completely recovered itself, and its Revenue is still about Rupees 2,00,000 or £20,000 per annum, below the standard previous to the Famine. The whole loss of Revenue in this Division may therefore be computed at Rupees 1,08,90,000 or £1,089,000, representing a destruction of Agricultural property which may be valued at from 6 to 8 millions sterling, according to the proportion which the Revenue is assumed to bear to the gross produce of the land. Regarding this proportion opinions differ, but for purposes of calculation I take it to be as 1 to 8.

45. Rohilkund shows very moderate traces of suffering, and even these were nearly obliterated within the five years after the Famine. The total loss in this Division did not exceed probably about Rupees 18,00,000 or £180,000, and one million sterling may be taken to represent the value of produce lost. The Revenue in the second period of five years after the Famine was about 5 lakhs per annum above the ante-famine standard, and it has continued rather to rise than fall ever since.

46. The Meerut Division shows not only no signs of permanent suffering, but marked proofs of great and steady progress. In the first five years after the Famine its revenue rose to over Rupees 7,00,000 or £70,000 per annum, and in the next five years to about Rupees 12,50,000 above the standard before the Famine. It has remained nearly constant ever since. These results fully confirm the belief that in 1837-38 the Meerut Division scarcely suffered at all. A trace of pressure in Bolundshuhur and somewhat severer suffering in Allyghur represent the full influence of the Famine, and as I find from the records of the Allyghur District that the whole amount of remissions deemed necessary by the Collector to mitigate the suffering was only Rupees 87,000, the

calamity could evidently have been but lightly felt. Where its intensity was the greatest, the results were very different to this, as the following Extract from Mr. H. Rose's Settlement Report of Cawnpore shows:—

*"Remissions of Revenue on account of the Famine in Cawnpore."*

| | | Demands. | Collections. | Remissions. |
|---|---|---|---|---|
| 1837-38 | ... | 21,75,858 | 11,57,219 | 10,18,639 |
| 1838-39 | ... | 21,77,733 | 17,36,426 | 4,41,307 |
| 1839-40 | ... | 21,89,658 | 19,24,360 | 2,65,298 |
| | | | Total of Remissions in 3 years... | 17,25,244 |

Writing in 1841 Mr. Rose mentions that the breadth of cultivation was still very much less than before the Famine, and indeed the Revenue is at this time a shade below what it then was. Similarly in the Agra District the remissions in the first year following the calamity are given at a little over Rupees 22,00,000 or £220,000.

47. The Delhi Division shows on the whole very slight signs of permanent suffering, and in the Benares Division there are none at all.

48. These details will, I trust, suffice to shew that the geographical limits of the Famine Tract of 1837-38 have been traced with as much care as the means available for the purpose will permit. There are strong indications that within the bad parts of the Tract there were degrees of suffering, not in such marked contrast as on the present occasion, but still discernible, and due doubtless in the main to the same causes, the variations in facilities for culture, and in the natural capacity of the different races of the people for Agricultural labor. But there is no reason to doubt that the pressure was much more general then than now by reason of the inferior ability of Native society to resist it.

49. The total area of the Famine Tract of 1837-38 may be estimated roughly at from 20 to 25,000 square miles, or from 12 to 16 millions of acres; it does not differ very materially in extent therefore from that of 1860-61.

50. It has been a matter of extreme difficulty to arrive at any fair estimate of the true number of the population affected by the Famine from the very rough materials available for the purpose. It was part of the duty of the Revenue Survey Department to collect statistics of population during the progress of their survey work, and occasionally a man with a special capacity for enquiries of the kind obtained tolerably consistent results. But taken as a whole the population returns of the Survey Department are of very little value; and as they were chiefly made during or after the Famine, they give us no satisfactory light on the numbers of the people prior to that event. In the Preface to his "First Report on the Ganges Canal,"* Sir Proby Cautley has brought these results together into one condensed view, which I place here in contrast with the results of the careful Census of 1853, for reasons which will be seen immediately.

* P. IV.

*Population of the Doab from the Survey Returns and from the Census of* 1853, *per Square Mile.*

| | Saharunpore. | Meerut. | Sirdhana. | Boolundshuhur. | Allighur. | Etawah. | Agra, Doab Portion. | Futtehpore.* | Cawnpore. | Allahabad. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Population about 1839-40 ... ... | 323 | 293 | 319 | 267 | 349 | 147 | 223 | 266 | 185 | 227 | Per Square Mile. |
| Ditto by Census of 1853 ... ... | 370 | 516 | ... | 427 | 527 | 364 | 537 | 428 | 500 | 495 | Ditto. |
| Differences ... ... ... | 47 | 223 | 197 | 160 | 178 | 217 | 314 | 162 | 315 | 268 | Ditto. |

It will be observed that in the Survey Returns the portion of the Agra District lying east of the River Jumna is stated to have 223 souls per square mile of area. On this Mr. C. G. Mansel, the Magistrate and Collector of Agra during the whole of the Famine period, subsequently the Revenue Settlement Officer of the District, and by this combination of duties having had rare opportunities of becoming thoroughly acquainted with the facts, makes the following remarks in his Settlement Report :—

" In the interesting and able Preface to Captain Cautley's Report on the Doab (Ganges) Canal, the population of the Doab portion of the Agra District is given from the Survey Returns at 223 per mile. But the Survey Returns were taken in 1837-38, when the miseries of the Drought were terminating in Famine. The Return is no index of the populousness of the District in its natural state. By a reference to the Statistical Table it will be seen that in 1831 the population of the Doab portion of the Agra District was actually 369 per square mile.

51. Assuming that these figures do represent, though with considerable latitude of possible error, the population before and after the Famine, their suggestiveness is very dreadful. The portion of the District of Agra referred to has an area of 415 square miles, and the population at the periods indicated would stand thus—

| | | | |
|---|---|---|---|
| Before | 1837-38 | ... ... | 153,135 |
| After | 1837-38 | ... ... | 92,548 |
| Emigration and mortality due to the Famine | | ... | 60,587 |

or very nearly 40 per cent. This is no doubt in excess of the truth, but as will be shown hereafter more plainly, the actual mortality was truly terrible, and far exceeded any present experience.

* The rate for the entire District of Agra in 1831 was 424 per square mile.

52. By a Census of the Muttra District made in 1835 by Captain R. Wroughton, a careful and competent Officer, the total population was then 528,395, giving a ratio of 333 per square mile. In Rohilkund the general proportion is about 325 per square mile.

53. Estimating from those various data as well as I can, I would say that the total population affected by the Famine of 1837-38 must have been between 8 and 9 millions, and that the population of the Districts within which the intensity of suffering was greatest, and the mortality highest, must have been roughly about 5 millions. In 1860-61 the corresponding numbers were about 13 and 5 millions; but in reference to the latter number, it will be noted that no such discrimination could be used in distinguishing the various interior areas of greatest intensity in 1837-38 as was practicable in 1860-61.

54. As regards the comparative intensity of the Drought, physically considered, during the two Famine periods, I think it may with confidence be taken as virtually the same. There are no records of any value showing the Rain Fall during the earlier period, when indeed the value of such Records in relation to Land Revenue questions was only beginning to be appreciated. Both Droughts, however, were heralded by previous seasons of dryness injurious to Agriculture. In 1833-34 there had been a partial Famine, but 1834-35 was a year of abundance. 1835-36 was indifferent, and 1836-37 again was good. It is well known that 1858, 1859 and 1860 were very dry and unfavourable. The nature of the Drought in each case was the same. An almost entire failure of the rains required for the autumn crop, and the consequent destruction of that crop, was followed by a total failure of the spring rains, so that no land could be cultivated but with the aid of artificial irrigation. When no autumn rains fall after August it matters very little, so far as Agriculture is concerned, what the previous falls may have been, and as it was the case that both in 1837-38 and 1860-61 not a shower fell from September till March within the bad parts of either Famine Tract, the conclusion that the physical intensity of the Drought was practically the same in both is a safe and reasonable one, and the broad fact of this identity makes the absence of detailed Registers in the earlier period a matter of no serious practical importance.

55. There is, however, one point, and a vital one, on which the two periods differ very remarkably. That is, in the prices of food-grains during the currency of the Famine in each. After a most careful and minute search, I have been able to find no instance during the very heaviest pressure of the Famine of 1837-38 in which the price of wheat rose above 11½ seers per Rupee. The grain prices are almost invariably quoted without reference to the value of the weights used; but as local grain weights generally somewhat exceed the Government standard, any error would most probably tend to lower the rate a little.

I give some illustrations of the prices in 1837-38 at different places :—

| | | |
|---|---|---|
| Allahabad ... ... ... | 17½ | Seers per Rupee. |
| Cawnpore ... ... ... | 13½ | „ |
| Allyghur... ... ... ... | 18 | „ |
| Futtighur ... ... ... | 11¾ | „ |
| Agra ... ... ... ... | 11½ to 13¼ | „ |
| Muttra ... ... ... ... | 12 | „ |
| Kurnal ... ... ... ... | 12 to 14 | „ |

The average price in the worst localities may safely be taken at 12½ Seers per Rupee. It is well known that in the worst localities of the Famine of 1860-61 the price was up to 7½ Seers per Rupee, and ranged between that and 8½ until the influence of the vast importations in February, March and April 1861 began to tell on the markets, when it fell to between 10 and 11. Making all needful allowance for such part of this marked difference of prices as may be due to intermediate variations in the value of money, there can be no question I think that the pressure from dearness of food ought to have been sensibly greater in 1860-61 than in 1837-38. It will not be overlooked either that the mass of the population which had to feed itself at these enhanced rates was much greater in the later than in the earlier period, as is clearly shown in the Comparative Table given in paragraph 50. The general resources available to meet this increased demand must therefore have been proportionally larger.

56. It is unnecessary to refer to the prices of other grains than Wheat during the two periods, for it is the common law of Famines in this country to equalise nearly the prices of all Grains fit for human food, ordinary distinctions between superior and inferior invariably disappearing to a very notable degree. Chart No. VI will illustrate this for the present Famine, and I give two other illustrations from earlier Famine periods, the one in Bengal, the other in the North-Western Provinces.

*Prices (in August) of the following Food grains in the Famine year* 1770 *contrasted with the Prices of the same in the plentiful year* 1714.

BENGAL.

| Year. | Rice. | | Inferior grains such as Jowar, Bajra, &c. | Gram. | Dal. (Pulse.) | Wheat. |
|---|---|---|---|---|---|---|
| | Best Sort. | Coarse. | | | | |
| 1714 | 80 | 120 | 120 | 130 | 80 | 90 |
| 1770 | 3 | 3¼ | 4½ | 15½ | 4 | 4½ |
| Differences ... | 77 | 116¾ | 115½ | 114½ | 76 | 85½ |

*Prices (average) of the following Food grains at Agra in the Famine year* 1838 *contrasted with the Prices of the same in the plentiful year* 1815.

NORTH-WESTERN PROVINCES.

| | Wheat. | Barley. | Bajra. | Gram. | Rice. | | Wheat Straw. | Dhl. | Common Fodder for Cattle. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1st Sort. | 2nd Sort. | | | |
| 1815 | 41 | 62 | 53 | 47 | 20 | 23 | 66 | 36 | 128 |
| 1838 | 13 | 16 | 18 | 13 | 9 | 11 | 20 | 11 | 78 |
| Difference ... | 28 | 46 | 35 | 34 | 11 | 12 | 46 | 25 | 50 |

57. On another point indicative of social condition and material prosperity the two Famine periods under comparison show marked contrast. No sooner had the serious pressure of the Famine begun to be felt in 1837-38, than the ordinary bonds of society seemed to be broken by it. Beginning in Rohilkund the population gathered into bands for plunder, and, driven desperate by starvation, they everywhere attacked the Grain stores in the larger villages and towns, and carried off their contents. Spreading rapidly, the disorganisation soon reached the Districts of the Lower Doab, and deplorable confusion is described as having prevailed from Bareilly to Allahabad. Troops had to be moved out on some occasions, and during the whole course of the Famine a largely augmented Police Force, both of Horse and Foot, had to be kept up to maintain the peace, a duty which however was very difficult to perform against large bodies of men whose natural instinct for fight or plunder was quickened by the sense of their own sufferings and the sight of those of their wives and children. Of such disorganisation as this we had no signs during the Famine of 1860-61, and though this may in part have been due to the influence of Military operations too recent to have lost their moral effect, yet I believe it was much more due to the far healthier condition of Native society now than then.

58. It is not my intention to reproduce here the harrowing and in many instances most revolting illustrations of the greater and more terrible mortality of the earlier Famine which have come under my notice in collecting materials for this comparative view of the two periods. From every large Station the testimony is the same, and the witnesses are so varied, and of condition so unimpeachable, that making every allowance for the excitement of the time, it is impossible to doubt the general fidelity of the sad pictures they present. The impression given is, in truth, that the calamity was of such intensity and magnitude as to have been really unmanageable. While for example the daily burials by the Police at Agra are reported to average nearly 400, numerous observers draw attention to the profusion of bodies near the River, and along the Roads. I

annex below a General Order* which gives a painful stamp of reality to like descriptions from Cawnpore, and in the Appendix will be found details from Futtighur confirming the same mournful conclusions. The Official Reports of Settlement Officers abound with references to the devastation and waste of life of which they had incontestable proofs in the course of their duties in the interiors of Districts. Of Etawah Mr. Martin Gubbins writes in 1841—" That the population has been very sensibly reduced by death is abundantly evident from the still deserted houses and abandoned lands, as well as from the general fall of rents throughout the District. This latter fact sufficiently indicates the competition, not of cultivators for land, but of landholders for cultivators, and it will no doubt require the lapse of many years to replace the population that has been swept away." Of the other bad Districts like evidence might be produced, but it is needless to give more than samples of such results. The general mortality cannot of course be known now with any approach to precision, but I doubt if it were less throughout the entire Famine Tract than about 800,000. The poorer landholders who in 1860-61 were just able to struggle through the time of greatest need suffered in 1837-38 as bitterly as did the mere labourers and artizans now. Large numbers of them died of starvation, and I find it specially noted that among the 80,000 paupers employed or supported by the Magistrate of Agra, a very large proportion was of small proprietors. This was the natural result of their social condition at the time, as before described. Their land was utterly valueless unless they could cultivate it—it had no market price, for no man would buy it, or make advances upon it as security, so that their only resource was to become paupers or perish.†

---

* *General Order by His Excellency the Commander-in-Chief, Head Quarters, Simla, April 6, 1838.*

" The Cawnpore Division Order of the 9th ultimo, directing the Commissariat Officer in charge of the Sudder Bazar to hire a boat with a small Establishment for the purpose of being employed in removing to some distance below the Station the numerous dead bodies which have collected on the bank of the River, or which may hereafter be thrown ashore is, for so long a period as the measure may be considered necessary, confirmed."

† As the Relief operations of 1860-61 are still in full progress, I have not attempted to compare the action during the two Famine periods in this direction. But I may state generally that while the money spent either in the form of Remissions or Relief works by Government was much more than now, the sum available for the aid of the Helpless Poor was much less. The latter were left exclusively to the charity of the Community, unaided either by Government donations or by such munificent contributions as the English subscription in 1860-61. The Indian Community responded then as always most earnestly to the call made upon it; but it may be doubted whether the entire sum spent through the agency of Relief Committees in 1837 exceeded £40 or 50,000. Government on the other hand spent enormously. It is officially stated that before February 1838 £600,000 of Revenue were remitted, and the process, as we know, continued long after. I find it difficult to credit some of the Statements of expenditure on Relief works. I find it estimated in the Agra District only, and apparently on an official basis, at Rupees 13,20,000 or £132,000. Agra was, however, the great central point of suffering, and vast crowds gathered there. The official Returns show that the daily strength of the working parties was a little over 77,000! At Cawnpore and other places great numbers were employed in like manner. The system, however, does not seem to have given satisfaction. There was vast expenditure and no supervision. I annex the judgment on it of one of the most active and intelligent of the District Officers engaged in administering it, and the impression left by it is not pleasant.

" It was impossible, says Mr. H. Rose in his Settlement Report on Cawnpore," to have met this calamity in a more liberal and humane spirit than the Government evinced on the last occasion (1837-38). But still, at least as regards this District, there were two errors committed which may be avoided hereafter on a similar occasion.

" The first error was leaving the superintendence of the labour of the starving poor in the hands of the local Civil Officers, instead of appointing to that duty an Engineer Officer with a large and efficient establishment of subordinate

59. Contrasted from these different points of view, the general conclusion regarding the two Famine periods is, that as in all the material conditions by which intensity of suffering is decided, 1860-61 was fully equal to 1837-38, while in some of the most important, as price of food and mass of population for example, the later was decidedly in a worse position than the earlier period, the actual sufferings of the community ought to have been greater now than then. Yet we know that this was very far from being the case, whether that intensity be measured by the sacrifices entailed on the State, or by proofs of misery visible among the people. Neither will Revenue have to be abandoned now to an extent at all comparable with what was needful then; nor has society become disorganised; nor have the people died in any such terrible proportions; nor will the influences of the suffering, mournful though in many instances it has been, continue so long; nor has the great body of the humbler proprietaries collapsed under the greater pressure; and these results lead directly to the more close consideration of the causes to which differences so marked are to be attributed. No part of the subject will guide us more immediately I believe to sound remedial measures than this.

---

Europeans to assist him It is short-sighted economy when the Government have to employ a starving population not to go to the expense of entertaining an establishment sufficiently able and extensive to insure that their labour is well applied. In this District it is useless to deny (and I make the acknowledgment with less hesitation, because it chiefly reflects upon myself) that the advantages derived from the labour of the working poor in 1838 were far from commensurate with the expenses incurred, and that nothing like that profit which would have resulted under a more efficient superintendence was obtained.

"The second error was in not being sufficiently explicit and early in making known to the people the extent of negative relief intended to be granted by means of Remission of Revenue. It is true, little or nothing was collected by Government until the spring (Rubbee) harvest was ripe, and the people were early told they were to expect leniency. But the Collector could not tell them unfortunately, what amount of Remission it was intended to allow; and whilst he was prosecuting his inquiries to determine that point, the landlords, never before having experienced or even heard of such sweeping remissions as were ultimately granted, and expecting in their most sanguine hopes nothing beyond a remission of 10 to 20 per cent. of the Revenue, continued to press their cultivators for the rents; thus driving away thousands who, if unmolested, would have remained in their villages, and by means of artificial irrigation would have raised a sufficient spring crop to subsist on.

"Should the country therefore ever be again visited by a similar calamity, I would recommend as a first step that the total suspension of all demands for the November and December instalments should be proclaimed, provided the landlords adopted the same course towards their cultivators: and that the duty of the Native Revenue Officer and the Collector should be limited to ascertaining how far the landlords adhered to that provision, and taking of course, when they deviated therefrom, a fair proportion of the Rents exacted by them from the cultivators.

"When the spring crop came into the market, it would be ample time to determine what each estate should pay. Nor is there any danger that such a course would cause undue loss of Revenue. The scramble between the Native Revenue Officer and the landlords to forestall each other in getting hold of the Rents would cease, and instead of the desire to exact all he could out of the tenant, the landlord would be impressed with the idea that the more lightly he dealt with his people, the more considerately would he himself be dealt with by Government."

As regards Works the first of these errors has been carefully guarded against in 1860-61, and I believe the Remissions also have been so managed as to give substantive relief, though the greater landlords have been expected to pay their full quotas, and have done so to the great advantage of the Revenue, and in full proof of the value of a class of capitalists between the State and the cultivator. District Officers have, however, told me that they have constantly had their offers of Remission or Suspension of demand resolutely refused by proprietary communities, apparently under the fear of in some way or other compromising their rights by failing to pay their Revenue.

On the whole I believe the Relief system to have been better organised, better worked, and more wide-spread in its beneficial action in 1860-61 than in 1837-38.

60. Foremost then among the means whereby Society in Northern India has been so strengthened, as thus to resist with far less suffering, far heavier pressure from Drought and Famine in 1860-61 than in 1837-38, I place the creation, as it may almost literally be called, of a vast mass of readily convertible and easily transferable Agricultural property, as the direct result of the limitation for long terms of the Government Demand on the land, and the careful record of individual rights accompanying it, which have been in full and active operation since the existing Settlements were made. I have before described the condition of Agricultural property antecedent to these Settlements, and it will probably be admitted, without serious qualification, that a state of things more likely to weaken the Society living under it, could scarcely be conceived. To the great and unequal pressure of public burdens; to the hopeless confusion or ambiguities of title; to the frequent and arbitrary interferences then prevailing, have succeeded Assessments rarely heavy, generally moderate, and in many instances extremely light; titles minutely recorded and easily understood; long leases; and the guarantee of the enjoyment of all profits during the currency of such leases. The natural results of such a change in so vital a part of the social economy have grown steadily more and more apparent. Land has obtained an increasing marketable value. Its value as a security has doubtless been largely made use of in mitigating the pressure of the Famine. Beneath the surface there is continual change of Proprietorship in progress. Sales of land for arrears of Public Revenue have almost disappeared from the Public records, while sales by voluntary action, or in satisfaction of debts have vastly increased. These mutations almost uniformly indicate the healthy gravitation of capital to the land, and though some may mourn over the gradual but certain displacement of an ancient Proprietary with all its traditional memories, the revolution will advance just as surely as in the struggle of life, industry, thrift, intelligence; and wealth must displace indolence, extravagance, intellectual stagnation and poverty. The general tendency of local influence is to check this process, but the effort is idle, and may be mischievous. The action itself is, in so far as the stability of Society is concerned, matter for congratulation rather than matter for regret, and it is determined by natural causes which can no more be interfered with arbitrarily without damage, than can the natural laws regulating trade in any other forms. Whether we will it or no, however, the gradual growth of monied classes, and the progressive tendency of such classes to seek investments in land, are sure to bring the soil and the capital of the country more and more closely into an union, to be fruitful ultimately in the most beneficial results to all.

61. To show the stagnation before, and the growth subsequent, to the existing Settlements, I give the annexed Statement of the price of land at different periods in the District of Bareilly. I take this District as an illustration because no records of any other I have been able to procure cover so many years.

*Decennial Average Selling Price of Land sold by Private Sale in Bareilly.*

| Year. | On Total area per acre. | On revenue paying land per acre. | On land actually cultivated per acre. |
|---|---|---|---|
| | Rupees. | Rupees. | Rupees. |
| 1823 ... | 2-12-11 | 3-1-3½ | 4-6-6 |
| 1833 ... | 2-10-2 | 3-8-9 | 4-6-2 |
| 1843 ... | 5-5-6 | 6-4-1 | 7-10-8 |

It appears, therefore, that in 1823 land sold for Rupees 4-6-6- or about 8*s.* 9¾*d.* per acre of cultivated soil. Ten years later it sold for a shade less, but in 1843 the selling price had risen to Rupees 7-10-8, or to about 15*s.* 3*d.* per acre, being an increase of little under 75 per cent, and now it is about twice this rate. The best Revenue Authorities*, agree in estimating the average selling price over the North-Western Provinces in 1837 at one year's rent, or about 1⅓ times the amount of the Government demand on the total area sold. It had risen in 1848, as determined by very extensive data, to 3½ times the Revenue; and now it

* *Result of Sales in the settled parts of the North-Western Provinces for three years from* 1845-46 *to* 1847-48, *omitting Gorruckpore and Azimghur.*

| Form of Sale. | Total Acres sold. | Government Revenue on the land sold. | Price obtained. | Price per acre. | Percentage of Price to Govt. Revenue. |
|---|---|---|---|---|---|
| Private Sales ... ... | 7,15,000 | 8,60,455 | 29,92,221 | 4-2-10 | 347 |
| Sales by Decrees of Court ... | 3,11,791 | 4,24,628 | 10,94,832 | 3-8-2 | 258 |

*Results for Gorruckpore and Azimghur.*

| Form of Sale. | Total Acres sold. | Government Revenue. | Price obtained. | Price per Acre sold. | Percentage of Price to Government Revenue. |
|---|---|---|---|---|---|
| Private Sales ... | 1,05,880 | 94,736 | 9,89,728 | 9-5-7 | 1,044 |
| Sales by Decrees of Court ... | 1,01,697 | 71,272 | 3,17,723 | 3-2-0 | 440 |

Gorruckpore and Azimghur are shown separately by reason of the lightness of the Assessment ensuring far better prices than elsewhere. It will not fail to be noted how greatly a light and easily borne Assessment increases the value of property in land, and so strengthens the Community against times of trouble.

*Results of Sales of land in the Allahabad District for five years.*

| For what period. | Average Price per acre by Public Sales. | Average price per acre by Private Sales. | Rate of Government Revenue per acre. | Number of years' purchase of Revenue. | |
|---|---|---|---|---|---|
| | | | | Public Sales. | Private Sales. |
| | Rupees. | Rupees. | Rupees. | | |
| 1849-50. ... | 2.50 | 5.00 | | 2.08 | 4.16 |
| 1850-51 ... | 5.73 | 8.23 | | 4.77 | 6.85 |
| 1851-52 ... | 5.25 | 6.58 | 1.2 | 4.37 | 5.48 |
| 1852-53 ... | 7.08 | 5.08 | | 5.90 | 4.23 |
| 1853-54 .. | 11.21 | 9.15 | | 9.34 | 7.62 |

This Table shows the result, not at all common, of a steady increase of price of land sold by decrees of Court, thus indicating an increased open competition for it. The Government Revenue in Allahabad averages Rupees 1-3-2 per acre on the total area, so that in 1853-54 the selling price was rather over nine times that standard.

It will of course be borne in mind that this is not the price of the Fee Simple of the land, but of the right to enjoy that part of the rent which remains after the Government Demand has been satisfied, all subordinate rights continuing intact.

may safely be taken at about five times that standard. The total amount of the Land Revenue in 1837-38 in those parts of the North-Western Provinces and Delhi Territory under long Settlements was, in round numbers, 3½ millions sterling. The average value of the land was, therefore, somewhat more than 4½ millions. In the 24 years that have since passed, this value has risen to five times the amount of the Public Demand at the earlier date, or to 17½ millions, having thus increased the wealth of the Landholders by the great sum of nearly 13 millions sterling. Under the administrative improvements of the period this wealth had ceased to be locked up and untransferred ; and it can, I think, admit of no question that society so strengthened must have been competent to bear much heavier strains, than it could bear before.

*Results of Sales of land in the Futtehpore District from* 1844-45 *to* 1850-51.

| Form of Sale. | Total Acres sold. | Government Revenue on the land sold. | Price obtained. | Price per Acre. | Ratio of price to Government Revenue. |
|---|---|---|---|---|---|
| | Rupees. | Rupees. | Rupees. | | |
| Private Sales ... | 39,137 | 52,406 | 1,03,296 | 2-10-2 | 1.97 |
| Sales by Decrees of Court ... | 2,880 | 4,479 | 8,760 | 3-0-8 | 1.96 |

Land therefore sells very low in Futtehpore, being not more than two years' purchase of the Government Revenue.

*Results of Sales of land in the Cawnpore District from* 1844-45 *to* 1845-46.

| No. of Estates sold. | Form of Sale. | No. of Acres sold. | Government Revenue on the land sold. | Price obtained. | Price per Acre. | Ratio of price to Government Revenue. |
|---|---|---|---|---|---|---|
| | | Rupees. | Rupees. | Rupees. | | |
| 394 | Private Sales ... | 1,08,271 | 1,38,666 | 3,57,795 | 3-4-11 | 2.58 |
| 186 | Public Sales ... | 45,909 | 65,475 | 82,203 | 1-12-7 | 1.25 |

*Results of Sales of land in the Allyghur District from* 1839 *to* 1852.

| No. of Estates sold. | Form of Sale. | No. of Acres sold. | Government demand on the land sold. | Price obtained. | Price per Acre. | Ratio of price to Government Revenue. |
|---|---|---|---|---|---|---|
| | | | Rupees. | Rupees. | | |
| 352 | Private Sales ... | ... | 1,06,517 | 3,28,364 | .. | 3.08 |
| 657 | Public Sales ... | ... | 2,72,837 | 9,05,805 | ... | 3.32 |

These illustrations will suffice to show the general selling price of the Proprietary right in land within the tract under notice. The extremes are great, but a general tendency to higher value will be noticed in proportion to the moderation of the Public Demand, and that from four to five times that Demand is as noted in the Text a fair general average.

62. Such then having been the general results of the protracted fixity of the Public Demand, the security of titles, the general moderation of assessment, the recognition and careful record of rights, and the reasonably equable distribution of the burden of land taxation, which were the main characteristics of the Settlements of 1833—45, the inference seems irresistible, that to intensify and perpetuate those results, we must proceed still farther in the same healthy and fruitful direction. The good which has been done by partial action on sound principles is both a justification and an encouragement to farther advances, and entertaining the most earnest conviction that State interests and Popular interests will be alike strengthened in an increasing ratio by the step; the first, and, as I believe, most important remedial measure, I have respectfully to submit for consideration, is the expediency of fixing for ever the Public Demand on the land, and thus converting the existing Settlements in the first great Sub-divisional Section of the tract of country now under reference, from Settlements for long periods only

---

In illustration of the statement made in the Text relative to the steady flow of capital to the land, I annex some proofs from District Records.

*Abstract Statement showing the Distribution of Landed Property at the commencement of British rule, and the same at the present time, in the District of Futtehpoor.*

| Tribes and Classes. | Number of Villages in possession of different classes at the Cession in 1802-3. | Number of Villages now in possession of different Tribes and Castes. | Variation. | |
|---|---|---|---|---|
| | | | Increase. | Decrease. |
| Rajpoots ... | 436 | 326 | ... | 110 |
| Brahmins ... | 167 | 209 | 42 | ... |
| Mussulmans ... | 608 | 605 | ... | 3 |
| Kayuths ... | 230 | 256 | 26 | ... |
| Buqquals ... | 0 | 30 | 30 | ... |
| Aheers ... | 9 | 2 | ... | 7 |
| Koormees ... | 91 | 60 | ... | 31 |
| Khuttrees ... | 0 | 36 | 36 | ... |
| Rustogees ... | 0 | 17 | 17 | ... |
| Lodahs ... | 42 | 16 | ... | 26 |
| Gosains ... | 0 | 4 | 4 | ... |
| Government ... | 0 | 1 | 1 | ... |
| Kulwari ... | 0 | 26 | 26 | ... |
| Eurasians ... | 0 | 2 | 2 | ... |
| Bhats ... | 5 | 9 | 4 | ... |
| Ugurwalas ... | 0 | 2 | 2 | ... |
| Jats ... | 1 | 4 | 3 | ... |
| Moroes ... | 2 | 1 | ... | 1 |
| Sungroms ... | 13 | 2 | ... | 11 |
| Telees ... | 1 | 2 | 1 | ... |
| Tumelees ... | 1 | 1 | ... | ... |
| Sonars ... | 0 | 2 | 2 | ... |
| Kham Tehseel ... | 7 | ... | ... | 7 |
| | 1,613 | 1,613 | ... | ... |

Grouping the different Castes under the two great Divisions of Agricultural and Commercial, the following abstract shews pretty nearly the movement of Proprietary Right among them during the last fifty years :—

| | | | | *Estates.* |
|---|---|---|---|---|
| Loss by the Agricultural Castes | ... | ... | ... | 184 |
| Gain by the Commercial Castes | ... | ... | ... | 192 |

The Collector observes that at the time of Cession the purely merchant (Mahajuni) Castes did not hold a single estate, whereas now they have 85. The other gains have been made by Brahmin Bankers or the like, and the result will, I think, seem conclusive in this instance as to the tendency of the monied classes generally to seek investments in land.

into Settlements for perpetuity. I limit this to the first Sub-division at present simply for convenience. The second Sub-division is much mixed, and still, in part at least, in a state of transition, unsuited to the adoption of the course which can safely be recommended for the first. But if it should hereafter appear that the same principle can be extended beyond the limits of the first Sub-division, as shown in Chart No. VII, its beneficial influence would there be the same.

63. So far back as 1802-3, the pledge of a perpetual Settlement of the Land Revenue was given by the local Authorities to the people of these Provinces, subject however to the sanction of the Court of Directors. In describing the

---

The same inference is warranted by the following :—

*Statement shewing the Distribution of Landed Property at the commencement of British Rule and at the present time in the District of Cawnpore.*

| Tribes and Castes. | Number of Estates in possession of different Classes. | | Variations. | |
|---|---|---|---|---|
| | At the Cession. | At the present time. | Increase. | Decrease. |
| Rajpoots ... | 992 | 839 | ... | 153 |
| Brahmins ... | 335 | 522 | 187 | ... |
| Mussulmans ... | 191 | 325 | 134 | ... |
| Kayuths ... | 219 | 189 | ... | 30 |
| Buqquals ... | 20 | 50 | 30 | ... |
| Aheers ... | 53 | 36 | ... | 17 |
| Koormees ... | 144 | 159 | 15 | ... |
| Mullahs ... | 6 | 3 | ... | 3 |
| Khuttrees ... | 11 | 13 | 2 | ... |
| Goojurs ... | 2 | 2 | ... | ... |
| Lodahs ... | 10 | 5 | ... | 5 |
| Gosains ... | 2 | 11 | 9 | ... |
| Byragees ... | 0 | 2 | 2 | ... |
| Government ... | 0 | 6 | 6 | ... |
| Kulwari ... | 1 | 24 | 23 | ... |
| Europeans ... | 0 | 24 | 24 | ... |
| Joolaha ... | 0 | 0 | ... | ... |
| Bhoorjee ... | 0 | ½ | ½ | ... |
| Bhat ... | 8 | 8 | ... | ... |
| Jumaya ... | 7 | 6 | ... | 1 |
| Jats ... | 0 | 2 | 2 | ... |
| Kachee ... | 5 | 2½ | ... | 3 |
| Bahelees ... | 0 | ½ | ½ | ... |
| Kurbur ... | 4 | 3 | ... | 1 |
| Teleo .. | 0 | ½ | ½ | ... |
| Mahratta ... | 0 | 2 | 2 | ... |
| Bhutiara ... | 0 | ½ | ½ | ... |
| Chumar ... | 0 | ¼ | ¼ | ... |
| | 2,010 | 2,010 | ... | ... |

Here the movement may be shown in abstract thus :—

| | |
|---|---|
| Loss by the Agricultural Classes ... ... ... ... | 153 |
| Gain by the Commercial Classes (excluding Mussulmans) ... ... | 219 |

The Merchant or Mahajun castes are represented as holding 301 Estates, and as paying between one-sixth and one-seventh of the Government Revenue. Some of the purely Agricultural Classes have gained considerably; but, on the whole the movement has been much in favor of the mercantile and monied classes, including among them the Priestly Order, as represented by Brahmins, Gosains, Byragees, who have increased their holdings since the Cession by 192 Estates.

It will doubtless be noticed that during the period under reference the European Proprietors of Estates in Cawnpore have increased from 0 to 24.

In the District of Allyghur the Mercantile Class holds 255½ Estates out of 2,063, and some similar proportion will be found to prevail over the whole Tract under reference. But I need not dwell longer upon the question, as the details given will sufficiently establish the general accuracy of the Statements in the Text.

Fiscal System of that period, and the state of general misery and oppression which had prevailed, Sir Robert Montgomery thus alludes to the temper and feelings of the people:—

"I have quoted enough to show the state of the country then about to be subjected to British management.

"The first step was a false one. The Revenue (of the District of Cawnpore) was raised from Rupees 22,56,156 to Rupees 24,87,924. * * * * *. The people, however, were full of confidence in the justice and integrity of the British Government, and, looking forward to the blessings of a perpetual Settlement, such as had been formed in Bengal, were ready to accede to any terms."

Such a settlement was negatived, however, at the time by the Home Authorities, and, looking back from the vantage ground of the long intervening experience, it appears clear that, if made in the dense ignorance which then prevailed, it must have involved, unconsciously to its authors, a hideous amount of injustice and wrong. More than a quarter of a century was allowed to pass, however, before even a moderate degree of light was let in upon the various bearings of the question; and even now, at the end of more than half a century, many will still doubt whether we can safely grant to the people those blessings which were anxiously expected by their fathers, when the country first came under British Rule. I believe, however, that the boon of a Public Demand fixed for ever would be appreciated at this time even more heartily, because far more universally, than at that remote period, for thousands would share, each in his degree, in its benefits now, by reason of the general recognition and record of individual rights, for tens who would have shared then.

64. It may be supposed that a great sacrifice of Public Revenue is involved in the concession of a perpetually fixed Demand on the part of Government. It is to be observed, however, that (with a single exception to be noticed separately) the recent tendency of the measures of Government has shown a different conviction, and indicated a belief that its interests are best secured, not by general enhancement, but by general lightening of its demand on the land. The latest orders under which Settlements now in progress are conducted, prescribe a reduction of the proportion of the Rent or net produce hitherto appropriated as Government Revenue from 66 to 50 per cent; and I have no doubt that this is a most wise and prudent step, sure to justify itself before many years pass away. It is scarcely possible indeed that a tax on Rent, which, even at its minimum absorbs half that product, and presses exclusively on a single Section of the Community, can be permitted to increase. The tendency will, I believe, be quite in the opposite direction, and instead of desiring to raise the moderately assessed Districts to the level of the highest, the best Revenue Authorities will probably seek to lighten the pressure on the latter, and in this manner, rather than by the converse process, to equalise the burden generally. Such an equalisation would lead to an universal increase in the wealth of the Agricultural classes. The price of land would rise gradually from four or five years' purchase of the Government

Revenue to 10 or 12 times that standard. Capital would in time accumulate in other hands than those of the Native money-dealers, or the scarcely taxed Native Commercial classes in general. The land would enjoy the benefit of such accumulations, and as a necessary consequence of the increased prosperity of that Class which must always be the very core of Native Society, and with the strength or the weakness of which the social fabric generally must always have the acutest sympathy, Trade and Commerce and General wealth would not only increase, but, as years passed on, the Community must grow stronger and stronger, and the risk of its collapsing under any such calamities as that we are now considering, would gradually become less and less. Assuming, then, that the results of the measure would, in some degree at any rate, realise these anticipations, it seems unreasonable to suppose that an intelligent and powerful Government could fail to participate in them. Its intelligence would direct it to the least offensive and most effective means of sharing in the general prosperity, and its power would insure the fair trial and ultimate success of those means. There would be no real sacrifice, therefore, I believe, but, on the contrary, a marked increase of the Public resources, from the creation of the increased private prosperity to which it is conceived that a Perpetual Settlement of the Public Demand must lead.

65. There is one direction, however, in which the sacrifice of the interests of Government does undoubtedly seem to be great under a Perpetual Settlement, and it is fairly matter of doubt in how far such a sacrifice is justifiable. All the best Revenue Officers with whom I have discussed the details of this measure, agree in finding the greatest difficulty in its way in the condition of Districts under Irrigation from Canals executed exclusively at the Public expense.* If these works had been executed with private capital and by private enterprise, the question would have assumed a very simple and easily managed form. But not only have private individuals had no connection with them but the whole Irrigation system has become so intimately, and so inextricably interwoven with the Land Revenue system, as to be exercising upon it constantly a most vital, and in some respects a most deranging, influence. I will limit myself at present to a general description of the way in which these results have been, or are now being, produced, more special details being reserved till the subject of Irrigation in general can be taken up in a subsequent part of this Report.

66. The case then stands thus: Between 1816 and 1860 the Government of India has expended at various times and on various works designed for Irrigation a sum that may be taken in round numbers at 3 millions sterling. It does not matter in the least what the actual sum has been; but to make the existing machinery of Irrigation as created by Government within the Tract of country under reference complete in all its parts, the expenditure would be pretty nearly what I have just stated. This sum has, of course, been paid exclusively from the Imperial Treasury. It is an investment of the funds of the Community, and in the results of this investment the Community has an unquestionable right to share on fair and equitable terms. Excepting in their capacity as members

of the tax-paying body in general, the proprietors of Estates watered from the Government Canals have paid no portion of the expense of the Works, and they have of course no claim more valid than that of their neighbours, to the enjoyment of the profits of the Works. In a case like this it is impossible to separate the interests of Government and the Community. They are in fact identical, and whatever of profit goes to Government, or whatever of sacrifice is thrown upon it, is really the profit or the sacrifice of the Community at large. Hence, then, the Officers employed in settling the Land Revenue have invariably asserted the right of Government to exact a higher revenue than usual from Estates benefitting by Irrigation from Canals constructed solely at the Public cost. They refuse to recognise rights due to purely accidental vicinage to Canals. The users of Canal water pay a small Water-rate to the Canal Officers, and the revenue thus realised is the only revenue which appears in the Accounts of the Irrigation Department. But it is an utterly fallacious index of the true profits derived from the Canals, inasmuch as the Settlement Officer has absorbed into the land Revenue a large proportion of true Canal profits. Hence arises the interweaving of the two systems to which I formerly alluded, and hence, too, the influence which these Estates, having water without enhancement of price through long Settlement periods, exercise in deranging the general economy of the Settlement system. For example, here are four Estates taken promiscuously from among the Canal Villages of the Meerut District, with details showing their condition at the commencement and close of the Settlement Period, whereby I think the difficulty under discussion will be made very plain.

*Statement shewing the Comparative Condition of certain Canal Villages in the Meerut District at Settlement and at the present time.*

| Villages or Estates. | Amount of Government Revenue. | Areas. | | | | | | Gross Produce. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Irrigated. | | Unirrigated. | | Total. | | | | |
| | | At Settlement. | In 1860-61. | At Settlement. | In 1860-61. | At Settlement. | In 1860-61. | At Settlement. | In 1860-61. | Percentage of Increase. |
| | | Acres. | Acres. | Acres. | Acres. | Acres. | Acres. | | | |
| | Rupees. | | | | | | | Rupees. | Rupees. | |
| A | 3,997 | 676 | 1,064 | 299 | 6 | 1,260 | 1,255* | 10,644 | 18,130 | 70 |
| B | 5,566 | 300 | 1,371 | 1,415 | 506 | 2,389 | 2,390 | 15,642 | 26,218 | 68 |
| C | 12,473 | 1,169 | 3,998 | 1,551 | ... | 4,508 | 4,554 | 33,262 | 63,864 | 98 |
| D | 5,363 | 394 | 1,029 | 1,302 | 29 | 2,215 | 2,336 | 14,302 | 31,902 | 123 |

67. Attention being given first to A, it will be seen that at Settlement in 1840-41 it had an irrigated area of 676 acres, and an unirrigated but cultivated one of 299, with culturable or waste land to the extent of 285 acres. By 1860-61 the irrigated area had been increased to 1,064 acres, by the absorption of the whole of the unirrigated area except 6 acres and the farther absorption of 95 acres of what had been considered before as either culturable or unculturable waste. The actual

* The small differences in the total areas are due to corrections of measurements made during the currency of the Settlement.

increase of irrigated area is about 57 per cent. But much of the new land had been occupied by the more valuable crops, Sugar-cane, Rice, Cotton, and the like, so that the annual value of the gross produce of the Estate, which at Settlement was Rupees 10,644, had risen in 1860-61 to Rupees 18,130, or 70 per cent. I may mention in passing, that these figures are taken from the Collector's papers simply as they stand there, and that they have not even been seen, so far as I know, by any Officer interested personally in the Irrigation Department. I accept them, therefore, with entire confidence as the statements of a witness with no motive to err.

68. In B the results are quite as marked. The irrigated area has increased from 360 to 1,371 acres, by absorbing 1,011 acres of the culturable but unirrigated land, and the value of the gross produce has risen from Rupees 15,642 to Rupees 26,218, or 68 per cent.

69. C which is a large and fertile Estate, well known to me and in singular prosperity, had at Settlement an irrigated area of 1,169 acres. It has since increased its breadth of irrigation to 3,998 acres, or by 342 per cent on the original area! Its annual gross produce has risen in value from Rupees 33,262 to Rupees 63,864, or 98 per cent.

70. D, is another fine Estate, known to me for many years as growing yearly in prosperity, and yet containing the most inveterate grumblers I ever met with. Here the increase of irrigated area has risen to the remarkable amount of 498 per cent on the same area at time of Settlement, and only 29 acres out of 1,302 are left without Irrigation. The annual value of the gross produce of the Estate has risen during the currency of the Settlement from Rupees 14,302 to Rupees 31,902, or 123 per cent.

71. Now it is one of the leading principles, observed in the formation of the Settlements, that equality in the distribution of the Land Tax, within reasonable limits of variation, should be carefully attended to. Absolute equality is neither practicable nor indispensable, but great departures from it in adjoining Districts, and still more within the same District, would inevitably cause, it is said, much discontent; unless such inequality had been created by the personal exertions of the Proprietors of improved Estates, and was traceable either to their superior intelligence, wealth, or industry. Inequality due to none of these, but simply to the vicinage of Canals, for the construction of which those remote from them have paid as much as those near to them, is, no doubt, likely to be a disturbing element in Native Society. The preceding details enable us to judge of the intensity with which it acts. In fixing the Revenue rates of a District, their incidence on the different great classes into which the area of an Estate is divided, *viz.*, Cultivated, farther sub-divided into Irrigated and Unirrigated, and Culturable, forming together the Revenue paying land, and Rent Free or Barren Waste, which do not bear any Revenue charge, is carefully noted. The results are compared in various ways with those obtained from other Estates, anomalies are investigated, differences adjusted, and ultimately such a degree of equality is obtained, as is sufficient for all practical ends.

Let us now look at the variations introduced into the Estates I have given as illustrations :—

*Statement showing the Comparative Revenue Rates at Settlement and now, as influenced by Canal Irrigation in the Estates noted therein.*

| | Government Revenue invariable during Settlement. | Areas. | | | | | | | Revenue Rates. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Irrigated. | | Unirrigated. | | Total cultivated. | | Total. | On Irrigated Area. | | On Area of Cultivation. | | On Total Area. | |
| | | At Settlement. | In 1860-61. | At Settlement. | In 1860-61. | At Settlement. | In 1860-61. | | At Settlement. | In 1860-61. | At Settlement. | In 1860-61. | At Settlement. | In 1860-61. |
| A | 3,997 | 676 | 1,064 | 299 | 6 | 975 | 1,070 | 1,360 | 6 0 11 | 3 12 1 | 4 1 7 | 3 11 9 | 3 2 9 | 3 2 9 |
| B | 5,866 | 360 | 1,371 | 1,415 | 506 | 1,175 | 1,877 | 2,390 | 16 4 8 | 4 7 4 | 3 4 10 | 3 2 0 | 2 7 2 | 2 7 2 |
| C | 12,473 | 1,169 | 3,998 | 1,551 | ... | 2,720 | 3,998 | 4,598 | 10 10 8 | 3 1 11 | 4 9 4 | 3 1 11 | 2 11 5 | 2 1 5 |
| D | 5,363 | 394 | 1,929 | 1,302 | 29 | 1,696 | 1,988 | 2,215 | 13 4 8 | 2 12 7 | 3 2 7 | 2 11 2 | 2 6 3 | 2 6 3 |

72. As the minute details of the distribution of the Government demand in these Estates are unknown to me, the Revenue Rates given for the Irrigated, and the Total Cultivation in the Table, are only relatively, not absolutely, accurate, but they are quite as well suited in that form as in any other to illustrate the present question. Whatever may have been the rates fixed on the Irrigated areas by the Settlement Officer at the time of Settlement, they have now decreased under the disturbing influence of Canal action in the following ratios :—

A about ... ... ... ... ... $\frac{1}{2}$
B „ ... ... ... ... ... $\frac{3}{4}$ths.
C „ ... ... ... ... ... $\frac{2}{3}$rds.
D „ ... ... ... ... ... $\frac{5}{6}$ths.

73. Hundreds of examples, many even more striking than the above, could be shown ; and when the causes of such derangements operate over vast areas, as they have now begun to do, they must revolutionise the action of the general principles of the Settlement, and modify vitally the relations of the Land to the Public Demand. The variation is not of course nearly so marked when the Revenue is thrown on the whole Cultivation, and is not perceptible at all when measured on the total area of the Estate. Canal Irrigation is the great cause of disturbance, and it must be admitted that the scale of its influence gives it claim to most careful consideration. The possession of it implies, that Estates which paid in 1840-41 a gross Revenue to the State of Rupees 27,699, continue to pay the same, while the value of their annual produce has risen from Rupees 73,850 to Rupees 1,40,114, or very nearly doubled.

74. In further illustration of the same subject, but from the different point of view taken by the Collector of Saharanpore, I annex the following Statement in which the columns headed "Rent Rolls" show the total Rentals of Estates at time of Settlement and now, and those headed "Revenue" show the Revenue under the last Settlement, and the variations proposed by the Collector under that now in course of formation. The Collector has added a column headed "Canal Expenses," but not knowing exactly what is meant, though I suspect it is the

amount of the Water-Rate paid annually by each Estate, I have omitted it, as of no great importance.

*Comparative Statement of Villages irrigated from the Eastern Jumna Canal in the Saharunpore District at Settlement in* 1840-41 *and in* 1860-61.

| No. of Estates. | Rent Rolls. | | Revenue. | | Percentages of Increase. | |
|---|---|---|---|---|---|---|
| | At Settlement in 1840-41. | In 1860-61. | At Settlement 1840-41. | Proposed in 1860-61. | Of Rental | Of Government Revenue. |
| 1 | 800 | 1,600 | 625 | 625 | 200 | ... |
| 2 | 350 | 850 | 250 | 400 | 243 | 160 |
| 3 | 200 | 450 | 150 | 340 | 225 | 126 |
| 4 | 400 | 1,250 | 302 | 400 | 212 | 32 |
| 5 | 1,500 | 3,200 | 942 | 1,150 | 113 | 22 |
| 6 | 500 | 1,125 | 364 | 450 | 125 | 21 |
| 7 | 1,100 | 2,450 | 905 | 1,148 | 122 | 27 |
| 8 | 2,000 | 4,350 | 1,356 | 2,000 | 117 | 48 |
| 9 | 700 | 1,450 | 510 | 600 | 107 | 20 |
| 10 | 700 | 1,700 | 584 | 1,100 | 143 | 88 |
| 11 | 3,000 | 7,900 | 2,000 | 3,500 | 163 | 75 |
| 12 | 900 | 1,925 | 744 | 800 | 114 | 7 |
| 13 | 500 | 1,650 | 404 | 650 | 230 | 61 |
| 14 | 500 | 850 | 334 | 425 | 70 | 26 |
| 15 | 1,200 | 2,470 | 1,035 | 1,400 | 105 | 35 |
| 16 | 900 | 1,650 | 652 | 670 | 83 | 2 |
| 17 | 800 | 2,100 | 452 | 600 | 162 | 33 |
| Totals and Averages. | 16,050 | 36,970 | 11,609 | 16,258 | 130 | 40 |

75. The general conclusion from these results is as strong as before. The Rental of the Estates has increased 130 per cent, and out of this increased rental the Collector proposes in these instances, to take for increased Government Revenue an average of 40 per cent. Under a Perpetual Settlement of course no such increase would be taken, or, in other words, the Canal Villages, assuming them to have paid Revenue rates of Rupees 1-1-3 at Settlement on their total cultivated areas, would have had them reduced now, by no special efforts of their own, to Rupees 0-10-5 per acre, their neighbours still continuing to pay the superior charge.

76. It is, of course, impossible for any race or tribe or clan, whatever its hereditary feelings or habits may be, to resist such fascinations as these, and the prospect of so doubling or more than doubling profits, while taxes continue unaltered, is an irresistible inducement to industry. Be the cultivators good or bad; be they on the one hand Jats or Aheers, or Koormees or the like, or on the other hand, Goojurs or Ranghurs, or Rajpoots or the like, they are sure to yield to the inviting prospect; and while the one indefatigably extend their careful culture, the other break up their ancestral jungles and plant wheat where of old they pastured stolen cattle. I have repeatedly, in my own limited experience, turned tracts of country notorious for the lawlessness of their people, into broad sheets of cultivation, by the simple expedient of running Irrigation channels through the hearts of them.*

* In illustration I may tell here a short story of the Mutiny. My friend and assistant Mr. Willcocks was obliged to fly from his station on the Eastern Jumna Canal in May 1857, accompanied by his wife, three children, and an Assistant Overseer, Serjeant Brown. The party had many narrow escapes in working their way from the vicinity of Delhi towards

77. While, therefore, some objection may be taken to the disorganising influence of extensive Canal action on Revenue relations, and while I may admit the force of this objection as bearing on the conversion of prolonged into Perpetual Settlements, I believe that due consideration should also be given to its strengthening and progressive tendencies. I have already likened these rich tracts, secure against the fluctuations of season, and filled by a prosperous people, to the bars and bonds that hold material structures together; and our experience of the Famine of 1860-61 is certainly full of proof of the justice of the comparison. I have not seen, in my own experience, much display of those feelings of discontent and dissatisfaction with the good fortune of their neighbours, which people in Districts as yet unsupplied with Canal Irrigation are said to feel. I have even been told by some that such Irrigation is regarded within and without Canal Districts as rather more of a curse than a blessing; while again I have learnt from all who have lately seen the action of the System, and have been able to judge for myself, that its influence for good is, in fact, beyond all gainsaying. It is at the same time right to make it known, that importance is attached to the disturbing influence under reference, by most of those to whose judgment and experience on such points I willingly defer with respect and confidence. I have accordingly given much anxious thought to the working out of plans whereby the influence of Canal action may be made compatible with a Perpetual Settlement of the land Revenue, and I am confident that this result may be attained without serious difficulty. The details are intimately connected, however, with questions bearing on Canal administration generally, which must come under discussion hereafter, and it will be best to give the whole together. But, meanwhile, it is proper to say that my conviction of the expediency of fixing the Public Demand in perpetuity is quite unaffected by the peculiar position of Districts having Canals of Irrigation executed solely at the cost of the Government within their limits. Even if it were necessary to omit the strips of country so situated for a time from the perpetually settled Tract, it would be better to do so than, by reason of the existence of these Zones of Irrigation, to deny the great and strengthening boon to the Tract in general. I trust to be able to prove that the first alternative is altogether unnecessary, but I have no hesitation in declaring my preference for it, should the proof fail, over the existing system of progressive enhancement of the Land Tax even though at long intervals apart.

---

Saharunpore, but managed to reach the Western part of the latter district, when they were all taken possession of by a party of Goojurs and carried by them to their village. There they were hospitably cared for for about a month, housed in the best house the place afforded, and protected against all injuries, their Goojur protectors having on one special occasion shown perfect readiness to fight a body of mutineers or rebels who required the Europeans to be given up to them. Willcocks and Brown, however, being both resolute men, and the aspect of their party being threatening, the mutineers moved on. Thus matters continued till the country was more settled, when the head man of the village with a strong party of his people escorted his guests into the Station of Saharunpore and delivered them over to the Magistrate in all honor and in good condition. The village was a canal village, and on hearing of its conduct I took upon myself to grant it at once the use of as much canal water as it could employ free of all charge for ten years, and the last private note I ever received from the late Lieutenant-Governor Mr. Colvin, expressed his full approval of the grant. Goojurs though the people were, the temptation to industry was really irresistible, and in about two years they had brought very nearly all the land of the village capable of being irrigated under irrigation, increasing their profits of course very largely. They became in fact too suddenly rich and prosperous, as I learnt when last at Saharunpore that they had quarrelled amongst themselves. This will end in time, however, but of their susceptibility to such influence as abundant means of irrigation bring in their train, there can be no doubt.

78. The objection just dealt with has other aspects, and there are additional reasons against pressing it too far. If so pressed, it would paralyse all material or administrative improvements likely to produce inequality in the social status of different classes of the people. If such inequality produced by Imperial Canals is a mischief to be abated, only by the periodic sweep of the Collector's measuring chain over the land, why except like inequalities due to Imperial Railways or Roads? We know that the vicinage of these is as sure to produce them as the vicinage of Canals, though the process may not be so speedy, or the results so soon measurable. Why, too, except natural differences tending to the same end, class industry, class thrift, and other qualities, whose influences are self-evident? It is undeniable that the ultimate tendency of a Perpetual Settlement, with the stimulus it gives to action, the free scope it allows to capital, the fair play it secures to capacity for business, and so on, is to establish and consolidate gradations in society. Is this really any objection to it? I cannot help thinking, for my own part, that it is one of the best promises the scheme possesses, for it promises to correct gradually and naturally, without shock or injustice, Social Laws and customs, which, like those of Inheritance for example, tend to perpetuate poverty, and Administrative Policies, which, though sanctioned by loved and respected names, and growing out of pure and high principles of humanity and good will, have yet been injurious and weakening in their influences on Society.

79. It will be understood then that, in advocating a Perpetual Settlement of the Public Demand on the land as a means of strength and growth to the Community in the Famine Tracts, I contemplate no interference whatever with existing rights in the soil. The full enjoyment of these is guaranteed to their Proprietors by the most solemn and repeated sanctions. But I anticipate that, under the free action of the laws which mould and form societies, much, if not all, that is obstructive and objectionable in the influences of these rights, will gradually disappear. The steady gravitation of capital to the land, of which the evidences are already unquestionable; the tendency to aggregation rather than to minute sub-division of the soil, of which proofs are discernible; the growth of wealthy Communities, such as I have indicated in speaking of the influences of Canal Irrigation, with many other points, all indicate the direction in which Society is moving; and I am sure that, such being the case, the safest and best policy as regards its internal action is simply to leave it alone, and let it assume its natural forms and conditions, with the smallest amount of external interference that is consistent with good and efficient Administration. Sudden or magical strides in improvement are neither expected from fixity of Demand, nor are they possible. But that the principle is sound and its action satisfactory have been proved by thirty years of trial. The time for the next step in advance is, therefore, now believed to have arrived, and what is expected from its adoption, is only an acceleration of that growth and progress of which I believe I have given sufficient proof, and a steady though more rapid strengthening of the Community in its most vital relations to resist such calamities as have lately swept over it, and must be expected to sweep over it again.

80. It seems scarcely necessary to notice an objection so little likely to have serious weight as that the people do not care for having the Public Demand on their land fixed in perpetuity. Yet, as this objection has been not unfrequently stated to me, I may say that we have excellent authority for believing they earnestly wished it fifty years ago; and all the Native evidence I have been able to gather, leads to the conclusion that this desire has not lost its force now. It is not in human nature that it should do so. Each man can, perhaps, best settle the matter by asking himself whether he would prefer a periodical variation of even a reasonable demand on his property, to the same demand fixed and known for ever, or if he would be indifferent to the prospect of obtaining the latter. I believe that Native society would regard it as a precious boon, and such, it seems to me, must be the conclusion come to, under the ordinary action of common feelings, and common sense.

81. Supposing then the principle to be conceded, there is an ample field for it to work in. The latest Returns accessible to me show that there is a breadth of culturable but uncultivated land, within the Tract to which reference is now being made, of nearly eight millions of acres, being equal to one-third part of its whole present cultivation, and to about one-sixth part of its total area. Since the existing Settlements began, a new domain of upwards of a million of acres has been added to the area of cultivation; and, under the additional stimulus of a Demand limited for ever, it may fairly be expected that the growth of this domain will be sensibly increased. Every such increase lightens the burden of taxation on the soil; and if the time should ever come when the entire culturable area shall be covered with crops, not only will the Proprietary have reaped additional profits from their land, but they will then have lightened the burden of the State Demand by not less than about Rupees 80,00,000, or £800,000 per annum. There must of necessity be a period of enquiry and revision before so important a principle as that of Perpetuity of Demand is accepted, and few points will be found more suggestive, I believe, than the distribution of the increase of culture above referred to. While lightly taxed and thriving Districts like Saharanpore, Meerut, all Rohilcund, and Goruckpore show their ratios of increase ranging from about 10 to 20 per cent, there is suggestive stagnation, or still more suggestive retrogression, in other Districts, where it may at least be suspected that the fiscal management is faulty. Into such questions, however, excepting in such broad lights as they present themselves to me in an enquiry like the present, it would be presumption on my part to enter. If the great general principle be admitted, its application in detail will be made by an Agency thoroughly competent to its work, and with such intimate knowledge of the true condition of Districts as will be a guarantee sufficient against any grave error.

82. By natural and legitimate sequence there will follow, on the grant of a Settlement of the Land Revenue in perpetuity, the grant of power to the Community to redeem that demand by an equitable payment in capital, should it so desire. So long as the State can be secured in the enjoyment of the Revenue it has fixed, there can be no insuperable objection to the form the

Revenue may take. So far at any rate as the Community is concerned, a payment of Revenue in a capital sum, estimated to give annual returns equal to the fixed demand, is virtually the same as payment year by year. It is rather with the State itself perhaps than with the Community that the difficulty lies. It is sometimes said half in jest, half in earnest, that the sure effect of a full Indian Exchequer is a war. And a war with all its financial pressure would no doubt be a strong temptation to anticipate the Land Revenue and to spend the capital by which it had been redeemed. There are also other circumstances under which like temptations might easily arise. But, giving full force to all the difficulties of the question, it cannot well be that they pass solution; and I think that without the grant of power of redemption at will, that of a Perpetual Settlement will be shorn of its fair proportions, and deprived of important aid. The importance, however, is rather remote than immediate, in the part of the Empire now under reference. I found among the most intelligent Natives, with whom I had opportunities of speaking on the subject, an impression that at first the power would be but little used. For this the general reasons given were the magnitude of the demand; the want of means of payment; the uncertainty of the times; the fear that though the Revenu might be duly redeemed under the British Government, yet that, in the event of misfortune befalling the Government, the engagement would break down; and the usual suspicions with which changes involving large money payments to the State are regarded. Though the appreciation of a demand fixed in perpetuity would, they thought, be immediate, desire to redeem the demand would grow but slowly. Such a redemption gives, of course, all who avail themselves of it, the deepest possible stake in the stability of Government; but the very extent of this stake would be a cause for hesitation in accepting it. European land-holders, or Europeans desirous of becoming so, would probably take advantage of it if they had the requisite capital, and their example would have its effect. I must add, however, that one of the most intelligent men of this class I met in the North-Western Provinces, the Proprietor of the Land-lord's right in very large Estates, told me that, while he would heartily appreciate a Perpetual Settlement of the Revenue, he would not be disposed to redeem it, even though he had the means of doing so, and that at first at least he believed few would. He thought at the same time that the disposition would increase, as recollections of disturbed times passed away. It is, however, for reasons often stated and obvious, of inestimable importance to scatter European settlers over the country; and it is certain that such a result would be greatly facilitated by granting to them the power, if they choose to use it, of redeeming the land they hold from the Public Demand, and all the interference it necessarily involves. My own conviction is, that the power might safely be conceded with advantage to the interests of the State in proportion to the extent to which it might be used; but that anticipations of any very large use of it are not likely to be realised for many years to come.*

* In the part of the country under notice such a process as purchasing the Fee Simple of the land is at present impossible. There is no such right to be sold. It does not exist, and it cannot be created without wholesale confiscation of private property. There is no acre of land among the 30 millions or thereabout forming the total area of the

83. With these improvements introduced, the strengthening action of the Fiscal System will have received the largest development which it is capable of receiving from the hands of Government. It will remain for the Community to take full advantage of them; and, judging of the future by the past, I do not think there is any reason to be doubtful on this point. Should another Drought have to be borne some twenty years hence, the justification of the principles now advocated will be as plainly stamped on the social fabric then, as I believe that of the principles established in 1833 is stamped upon it now. I therefore respectfully leave the decision with the Government of India, and proceed now to the next main subject of this Section, namely, the Irrigation System of Northern India, in reference to its bearings on the prevention or mitigation of the effects of seasons of Drought.

84. The first step needful towards giving sound views on this subject, is to determine as definitely as existing means permit the actual influence of the Irrigation System in its various forms. From thence we shall have a starting point, at least reasonably reliable, from which to estimate the extension that may be wisely and prudently given to the system, to make it serve, as nearly as may be, the purpose indicated in my Instructions. To do this with effect, however, it seems to me essential that I should limit my remarks to such parts of the country as I have either personal knowledge of, or can obtain access to data relating to, from which a sound judgment of their capabilities can be formed. Such conditions apply generally to the Tract of country extending from Rohilkund on the East to the Cis-Sutlej and Delhi Divisions on the West; from the Himalayas on the North, through the central plain included between the Rivers Ganges and Jumna to the junction of those Rivers on the South; and to the portion of the North-Western Provinces which lies along the right bank of the Jumna, including Bundelkund. Most parts of this large region I have either visited personally in connection with the duties of my former position as Superintendent General of Irrigation in the North-Western Provinces, or I am in possession of information regarding them, sufficiently accurate and detailed, to justify me in giving an opinion of their actual or prospective capabilities for Irrigation. It is assumed that within these limits the means of Irrigation by the natural process of Rain-

---

Tract on which private rights of various kinds do not exist, and arbitrarily to destroy these is what nobody would think of. Government can only dispose of what belongs to it, and all that does belong to it, is the right to sell the proprietary tenure of Estates on default of payment of Revenue. If there is no default, there is no power of sale. The buyer buys the proprietary right on its terms, and these terms do not imply the extinction of even the humblest subordinate rights. Such rights are quite as precious to their owners as his peculiar holding is to the Statesman of the Lake Districts, or the Yeoman of Kent or Sussex. But the proprietor of the superior right, supposing him to have capital, is almost sure to be able in time to purchase the inferior rights, and this process of simplification is, I have reason to believe, in active progress to no inconsiderable extent. There is some of the unpopularity connected with it which, among the ignorant, is connected with the action of grain-merchants in time of dearth, and the feeling is as unreasonable in the one case as in the other. The process is a natural one, and if honestly and fairly pursued, not merely a legitimate but a desirable one. It is the only one indeed which is consistent with respect for all rights of property; and while abuses of it may be checked, the use of it is beneficial. In time and under its operation the nearest approach practicable to tenure in Fee Simple may be made, but the process will be a slow one at best.

Of course the above remarks have no application to lands properly waste and burdened with no private rights. Of these, however, there are none of any importance within the limits of the Tract under notice.

fall is interrupted by the occurrence of a season of Drought, and the questions to be worked out are —

1*st.*—What mitigation of such a calamity might be looked for from existing means of artificial Irrigation?

2*nd.*—What extensions of those means can safely and prudently be undertaken so as to fertilize larger areas in future, and thus provide additional guarantees against the destructive effects of the recurrence of such seasons as are above supposed?

85. There is no part of the Hydrography of regions where Agriculture is dependant on Irrigation, which holds a more important position than those unseen Reservoirs, formed by the broad expanses of water-bearing strata, invariably found at differing depths beneath the surface of the land. They rank with the greatest Rivers in the extent of their influence, and it is the larger and more universal, inasmuch as the supplies from them are accessible to almost every Proprietary community however modest its resources, or however limited its possessions. Hence the immemorial importance of that branch of artificial Irrigation which is dependant on Wells. Because of the minuteness of its component elements, we are apt to undervalue its magnitude and importance, in contrast with those greater sources of supply furnished by our Canals of Irrigation; and it is not till we are compelled to measure the true dimensions of the aggregate effects produced by it, that we can fully appreciate their relative importance. Within the limits I have indicated above, the area of land irrigated from Wells is probably not less than from 3 to 4 millions of acres, and as yet at any rate, our Canal system, fed by our greatest Rivers, scarce rises to a fourth of this magnitude. It is plain then, that, among the constituent parts of our mechanism for artificial Irrigation, the first place is fairly assigned to Irrigation from Wells. It is not only the extent of its influence, however, which gives it this position. It is unquestionable that, at present at least, its effects are less open to doubt than those of Canal Irrigation. The superiority does not arise from any source inherent in Well Irrigation. It is mainly due to the fact, that the water obtained with much toil, and at great comparative cost, is used with corresponding caution. No waste is permitted; every channel is tended with exceeding care; the crop is not allowed to receive a drop more than is indispensably necessary to its maturity; and the limited supply at command is made to do the maximum of useful work. The time will come when the same causes will operate on Canal Irrigation, and existing differences in relative value will disappear. But in the meanwhile the produce from land under Well Irrigation is generally larger and better than from that watered in any other way.

86. The conditions under which the sub-soil waters in the Tract under notice are utilised vary almost indefinitely. No two Wells can be said to be of precisely equal capacities. The broadest differences are in the depths of the water from the surface; in the abundance of the volume supplied; and in the structure of the Wells themselves.

87. All over the Tract the water-bearing beds oscillate in level exceedingly, even within very limited areas. Where unaffected by local causes of disturbance, such as the vicinity of Canals, from the beds of which percolation of water into the adjoining soil takes place, the depths range from 20 to 80 feet, and in special localities descend even to 180 and 200. These latter, however, are altogether exceptional, and are usually limited to small tracts either on the borders of the great Sandy Desert, or in the vicinity of Mountains. They may safely be neglected in considering the influence of the Well system generally on the Agriculture of the country.

88. The volume varies with the force of the springs supplying the Wells. Often there is no living spring, but the water collects in the void space formed by the Well, under the influence of simple percolation from the damp sub-soil. In other cases a spring is tapped either at its head, or in its course, and a perennial supply is secured. The variations between these extremes are indefinite, but the Cultivator well knows the value of each.

89. Other elements of variation exist in the special forms of machinery used for the extraction of the water. In some Districts the rude mechanism of the Persian wheel with its chain of earthen pots is preferred. In others the huge leathern bag, not always uniform in its form or arrangements, drawn to the surface by oxen descending an inclined plane, whose depth below the level of the ground represents the depth of the water in the Well, is in general use. Or the wooden scoops worked by men from lift to lift, till the desired level is reached; or the simple earthen pot or light leathern bag at one end of a long lever, loaded at the other, and alternately raised and lowered by the movements of a man on either side of the fulcrum. Each of these forms has a separate value, and those values can never be estimated under conditions exactly the same. I have gathered together great collections of data bearing on the capabilities of each form of machine; but except as giving a basis for some general averages, they are separately of very little practical value, and the results in one District are no standard for those in others.

90. The two great distinctions in the structure of the Wells themselves are, the universally recognised ones of Permanent and Temporary. The Permanent (*Pucca* in the Vernacular) Well is the great village institution. It represents the village capital and its spirit of enterprise. The multiplication of permanent masonry Wells is a very strong indication of a thriving community. Their abandonment, except under special conditions, is at least a suspicious indication that all is not as it should be. It may mean no harm, but it is provocative of doubt, and usually leads to enquiry. These Wells are of all sizes, from the dwarf of 3 feet in diameter, to the giant of 30, so to speak of their capabilities as sources of supply for Irrigation is out of the question, unless not only their dimensions, but all other particulars are first given. The Temporary (*Kutcha*) Wells, too, play an exceedingly important part in Irrigation. Their aggregate influence, indeed, much exceeds that of the Permanent ones; and some circumstances, of

which no very clear explanation has yet been given, seem to recommend them for increased use among the Agricultural community, as they certainly grow in larger proportion than Permanent Wells. They, also, are of very varied capacities for usefulness. From some localities they are excluded altogether by reason of peculiarities of soil; but, in contrast with the areas within which they may be extensively employed, such localities are not very important. Sometimes they are simple excavations, circular or angular, from the surface to some distance beneath the sub-soil water level. At other times they are provided with wooden curbs, and are lined with wicker work or rolls of twisted straw. According to circumstances, they last from two to seven or eight years, and I have seen all the variations of lifting machinery in use with Permanent Wells used with them.

91. The difficulty of fixing average values for the work of either class of Wells will readily be understood from these details. But after carefully considering all the conditions for each, I think a fair impression of their general capabilities will be given, by assuming that a Permanent Well is equal to the Irrigation throughout the year of 9 acres, and that a Temporary Well is equal to that of 3 acres. I have known many instances of from 15 to 20 acres being brought to maturity under a single large and bountifully supplied Well. But I have also known localities where 4 or 5 represented the maximum of work, even under the most strenuous efforts, made by the best class of cultivators. The error in the standards assumed will not, therefore, be great; and for all present purposes the conclusions established by their use may be accepted with reasonable confidence. The proportion of Permanent to Temporary Wells is, of course, also very variable; but, as a general rule, it may be said that to one of the former there are four of the latter, and this ratio will be used hereafter.

92. About ten years ago, considerable anxiety was created by a report that, in some of the Divisions of the North-West Provinces, the number of Permanent Wells had sensibly decreased since the period of the Settlements, and enquiries were set on foot by the Local Government to ascertain first the fact, and next, if possible, its causes. The results were, a large collection of interesting information bearing on Irrigation by Wells; the establishment beyond question of the fact that a sensible, though local, decrease had taken place in their number; much discrepancy of opinion as to the causes of this decrease; a general denial of its implying that cultivation had decreased too; and a general belief, in which the Government seemed to concur, that though Permanent Wells had decreased, Temporary Wells had more than proportionally increased. The Native opinion was universal, that a material recession of the level of the water-bearing stratum had taken place since the Drought of 1837-38, and it was clear enough, from many examples, that Wells formerly in use for Irrigation had been left dry. But no very decisive evidence was produced as to the motives or causes of abandonment; and, on the whole, a local preference for the use of Temporary wells seemed the best explanation that could be had. Some of the information obtained helps me so much in trying to estimate the existing area of Well Irrigation, that I give an abstract of it here.

*Statement shewing the comparative number of Masonry Wells and Cultivated Areas in the parts of the North-Western Provinces and Punjab therein noted.*

| Province. | District. | Comparative number of Masonry Wells in use. | | | | Comparative Areas of Cultivation. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | At time of Settlement. | In 1849. | Variation. Increase. | Variation. Decrease. | At or near time of Settlement. | In 1853. | Variation. Increase. | Variation. Decrease. |
| | | | | | | Acres. | | | |
| N.W. Provinces ... | Saharunpore ... | 2,634 | 2,956 | 322 | ... | 688,567 | 774,253 | 90,686 | ... |
| | Muzuffurnuggur ... | 6,091 | 5,944 | ... | 147 | 628,863 | 670,468 | 41,605 | ... |
| | Meerut ... | 5,620 | 6,528 | 908 | ... | 805,871 | 907,758 | 101,887 | ... |
| | Bolundshuhur ... | 7,489 | 8,315 | 826 | ... | 663,242 | 715,587 | 52,345 | ... |
| | Allyghur ... | 11,730 | 10,998 | | 732 | 923 558 | 961,076 | 37,488 | ... |
| | Bijnore ... | 466 | 582 | 116 | ... | 501,940 | 590,522 | 88,682 | .. |
| | Muttra ... | 6,601 | 5,609 | ... | 992 | 673,805 | 733,362 | 59,557 | ... |
| | Agra ... | 8,003 | 6,073 | .. | 1,930 | 765,910 | 747,536 | ... | 18,247 |
| | Furruckabad ... | 548 | 698 | 150 | ... | 643,921 | 749,023 | 105,102 | ... |
| | Mynpooree ... | 11,186 | 9,170 | ... | 2,016 | 627,318 | 687,098 | 59,780 | ... |
| | Etawah . | 1,504 | 1,212 | ... | 292 | 519,881 | 557,804 | 37,923 | ... |
| | Cawnpore .. | 3,634 | 3,628 | ... | 6 | 781,903 | 800,438 | 18,535 | ... |
| | Futteypore .. | 6,854 | 7,023 | 169 | ... | 508,888 | 509,793 | 905 | ... |
| | Humeerpore ... | 2,565 | 2,337 | ... | 228 | 719,411 | 770,254 | 50,843 | ... |
| | Banda ... | 876 | 879 | 3 | ... | 964,328 | 846,811 | ... | 117,407 |
| | Allahabad ... | 5,705 | 6,780 | 1,075 | ... | 991,024 | 971,558 | ... | 20,366 |
| | Goruckpore ... | 32,845 | 41,637 | 8,792 | ... | 2,049,688 | 2,232,901 | 183,213 | ... |
| | Azimghur .. | 14,462 | 16,961 | 2,499 | ... | 756,975 | 798,707 | 41,732 | ... |
| | Totals | 128,822 | 137,337 | 8,515 | ... | 14,210,923 | 15,025,069 | 814,146 | ... |
| Punjab ... | Paneeput ... | 4,373 | 4,567 | 194 | ... | 892,019 | 407,051 | 15,032 | ... |
| | Hissar ... | 130 | 147 | 17 | ... | 993,047 | 988,923 | ... | 4,124 |
| | Delhi ... | 1,766 | 1,749 | ... | 17 | 244,128 | 263,208 | 19,080 | ... |
| | Rohtuck ... | 254 | 266 | 12 | ... | 589,887 | 641,792 | 51,905 | ... |
| | Goorgaon ... | 4,616 | 4,877 | 261 | ... | 689,353 | 895,940 | 206,587 | ... |
| | Totals | 11,139 | 11,606 | 484 | ... | 2,908,434 | 3,196,914 | 288,480 | ... |

93. A glance at the results shown in this Statement will prove at once, I think, that there is no necessary connection between the decrease of the number of masonry Wells and the condition of the cultivation. Allyghur, for example, has lost the use of 732 Wells since the Settlement, but its area of cultivation has increased by upwards of 37,000 acres. Muttra has lost the larger number of 992, and its increase of cultivated area is at the same time greater too, being over 59,000 acres. Still, more strikingly, the loss of wells in Mynpooree reaches to 2,016, being about a fifth of the entire number in the District at time of Settlement, and yet the area of cultivation has grown by nearly 60,000 acres.

94. It is only in Agra that a marked diminution of the number of Wells is accompanied by a decrease of cultivation. There 1,930 wells have fallen into disuse, and the area under culture has decreased above 18,000 acres.

95. In Allahabad a more anomalous result is shown, for while the number of Wells has increased by 1,075, the cultivated area has fallen off by upwards of 20,000 acres. I believe I am right in saying that this is due entirely to the section of the District, which lies West of the River Jumna, being in an indifferent fiscal condition. The loss of cultivation is limited to that locality, while the rest of the District is prosperous, and increasing its Wells accordingly. Banda has stagnated as regards its means of Well Irrigation, but its loss of cultivated area seems formidable, rising as it does to above 117,000 acres.

96. In the Punjab Districts, so far as I have been able to gather any information regarding them, the general conclusion is the same. It is thus quite clear,

from the progressive increase of cultivation in nearly every District of both Provinces, that substitutes for the masonry Wells lost in some, and means of meeting the increased demand for new cultivation in others, have been successfully found either in Temporary Wells, or from other sources.

97. It is the common habit of the Native Farmer to estimate the resources of his land for Irrigation of the kind under notice, not by the actual number of Wells it possesses, but by the number of bags, or other form of lifting machine, in use. Many Wells have two such bags, others three and even four. On 128,822 Wells for example at time of Settlement in the North-Western Provinces there were 175,938 lifting machines, indicating a good many double or triple Wells. In the Punjab Districts, on the other hand, the numbers of both very nearly coincide, indicating that few Wells have more than one form of lifting apparatus.

In estimating the capabilities of Wells for irrigation, I have made due allowance for the variations just indicated.

98. Of the entire means of Irrigation by masonry Wells shown in the Table, and amounting to 137,337, I estimate that 72,523 were concentrated within the limits of the Doab, or the tract of country lying between the Himalayas and the Rivers Ganges and Jumna, at the time of the last enumeration in 1848-49. I assume that the growth of the system from that year to 1857-58 was virtually uniform, but that it was checked temporarily by the events of the latter year. On these data the masonry Wells at this time in the Doab may be taken in round numbers at 70,000.

99. The corresponding average proportion of Temporary Wells may be taken at 280,000.

100. The aggregate area of Irrigation due to both classes will be 1,470,000, or for facility of calculation say 1½ millions of acres.

101. To maintain Estates in good working efficiency under all vicissitudes of season, and to admit of employment being always found for such proportion of the labouring Agricultural population, as will keep them above actual want, it is necessary that one-third at least of the cultivated land should be provided with the means of Irrigation. If this be done, it is practicable to ward off Famine even under the severest form of Drought of which we have yet had experience, but no less proportion can be accepted as an efficient protection. In estimating that each masonry Well will be adequate to the Irrigation of only 4½ acres in each crop, and each temporary Well to the Irrigation of only 1½ acres in each crop, I am satisfied that I have made ample allowance for the difficulties, always experienced during years of extreme dryness, in maintaining Irrigation. The existing Well Irrigation in the Doab would accordingly be sufficient to protect from risk of actual Famine a section of that Tract of country having a total area of about 4½ millions of acres. Of course, the higher above the proportion of one-third the watered

area can be carried, the greater the security provided; but that the minimum for safety has not been pitched too low will, I think, be admitted when I mention that it prevails to a very considerable extent among Canal Estates, and that in them Famine is wholly unknown. It will, perhaps, give a clearer conception of what is implied by these statements to say that, if the machinery for Well Irrigation thus represented to be scattered over the whole Doab could be concentrated in its lower section, it would prove a complete guarantee against Famine to the Districts of Allahabad, Futteypore, Cawnpore and Mynpooree, leaving of course all the Upper Districts without Well Irrigation at all. The total area of the Doab is, in round numbers, about 19 millions of acres, and for 4½ millions, being nearly 24 per cent of the whole, the Well system already provides security. It remains to enquire in how far security has been, or can be, insured for the remaining 76 per cent.

102. Over the entire extent of the Doab there are scattered low tracts of land of variable areas, into which the drainage waters of the country gather, and, in ordinary years, remain. In all Districts such "Jheels," sometimes assuming the appearance of small Lakes, at others degenerating into Marshes, are to be found. They abound in the low valleys of the great Rivers. They form the heads of the smaller streams which, rising in the plains, carry off the surface drainage during the rainy season to the Ganges on the one hand, or to the Jumna on the other. In seasons of great Drought few retain their ordinary supply of water; but the soil generally continues so charged with moisture, notwithstanding the evaporation of the surface waters, as to produce a rich crop. It was on such lands that, during the past year, some of the finest produce was to be found, and they may always be confidently calculated on as available for culture during periods of Famine.

103. But little reliance can be placed at such times, on the capacities of the ordinary village Tanks for Irrigation. Very few indeed escape the scorching influence of Drought, protracted through even a single season. Sometimes, however, their beds are available for culture by reason of their retaining moisture, and in this way they make some small addition to the area of cultivation to be depended on during Droughts. Their number is occasionally very great, and in some Districts it exceeds that of the Wells. But the cultivation dependant on them is necessarily very insecure, and its amount in average years is no reliable index of their influence in extreme ones.

104. Some of the minor Rivers retain a small part of their volumes under severe Droughts, and the percolation from their beds is sufficient to keep narrow strips of low-lying land within their valleys fit for culture. Taking all these sources of supply together, it is impossible, however, to attach any high value to them. They would probably not reduce the unprotected area, as given at the end of paragraph 101, by more than 2 per cent, and this may be taken as the nearest estimate of their influence at which I can arrive.

105. We have now to try to measure a more important source of security in the influence, present and prospective, of the existing Canal system, as developed within the Doab. Such a year as has passed is full of valuable instruction on this subject, not merely because of the general influence of the system in mitigating the severity of Drought and Famine, but still more, because of the means it supplies, of estimating the true effects produced by known volumes of water, under conditions which present themselves only at very distant intervals. Experience, which is limited to ordinary seasons, is necessarily imperfect, since it is by extreme seasons only that the true test of the efficiency of a Canal system can be applied, its defects clearly brought to light, and the remedies for them best indicated.

106. It may be considered as a condition almost indispensable to the permanent value of Rivers in connection with a system of artificial Irrigation, that their sources should be beyond the influence of the vicissitudes of ordinary, and in some very sensible degree, beyond even those of extraordinary, seasons. It is clear that, if under the pressure of a protracted Drought, the Rivers supplying the various channels were liable themselves to be exhausted, no trust could be placed in the protective influence of any system of Irrigation at the very times when such influence was most precious and necessary. In the case of the two great Rivers with which we are at present concerned, the elevation of their sources, and their direct connection with those inexhaustible reservoirs, formed by the perpetual snows of the Himalayas, insure the country they traverse against any such catastrophe as their complete exhaustion. No Drought, of which any record remains, has ever yet done more than reduce the average minimum supplies in some considerable proportion, leaving however always available volumes sufficient not only to protect, but, as will be seen hereafter, even to extend the usual areas of Irrigation. It is in fact with water under these circumstances, as with food. Motives to economy before unknown come into play, and either by the stern necessity of want, or under the irresistible temptations of profit, the reduced supply is made to spread over a much larger surface. With food at Famine prices men eat less; with water at Drought volumes men waste none, and watch with the keenest scrutiny the right application of every drop. When early in 1860-61 I learnt that the volumes both of the Ganges and Jumna were gradually descending below the lowest recorded standards, I confess that the first feeling excited was one almost of despair. It seemed as though the very foundations of our Irrigation system were being destroyed, and that it must virtually break down, just at that special crisis, by which the expense and labor incurred in calling it into action, had been mainly justified. It was not until opportunity had been given to observe among the people themselves, how readily and effectively they adapted themselves to the actual conditions of the case, that confidence was restored. None of the Himalayan Rivers escaped altogether the influence of the Drought. It was, of course, most noticed and carefully measured on those from which Canals are drawn; but general statements of its effects show, that from the Indus to the Gogra the diminution of all the great Rivers was very

perceptible. Doubtless the usual annual snow-fall in the Upper Mountains, and the rain-fall in the Lower, had been much below the average of ordinary years, and thus the drainage volumes passing into the Rivers were decreased. In the Ganges and Jumna, the diminution seems to have averaged about 35 per cent of the ordinary volumes available at the driest periods of the year. The same diminution was noticed in 1837-38; and so far as means exist for making comparisons, the extent seems to have been very nearly the same during the two periods. For the Ganges, of course, no records of measurements so early as 1837 exist, as the idea of using the River for Irrigation had only been suggested the year before. I have found numerous co-temporary notices, however, of its navigation having been virtually stopped above Benares, and being much more precarious than usual even below that point; and in so far as this effect is an index of relative volumes in 1837-38 and 1860-61, the inference of equality of diminution is sustained. As regards the Jumna, more positive results are attainable. The average discharge of that River during the period of Drought in 1837-38 was, I find, 2,198 cubic feet per second, its ordinary minimum volume being very nearly 3,500. The diminution is thus about 37 per cent. The physical conditions of the two Rivers are practically identical, and in 1860-61 the diminution of the Ganges was, as before stated, about 35 per cent of its ordinary minimum volume. As the greatest intensity of the Drought in the earlier period, was concentrated in the Southern Section of the North-Western Provinces, it is not unlikely that the sources of the Rivers in the Mountains were somewhat less affected then, than in 1860-61, when the greatest intensity was in the adjoining Northern Section But if this were so, its physical evidences are not so decided as to establish any marked difference between the Rivers at the two periods, and it may safely be assumed that they were influenced in an equal degree on both occasions.

107. Such being the case, it is to be seen next, to what extent they contributed to the Irrigation and security from Famine of the Doab, to which for the present attention may be limited. In 1837-38 the Eastern Jumna Canal stood alone in this Tract, and its effects were as follow:—

*Statement shewing Volumes and Areas of Irrigation of the Eastern Jumna Canal during the Famine of* 1837-38.

| | | Average discharge per Second at head of Irrigated Tract. | Area of Irrigation. |
|---|---|---|---|
| | | *Cubic Feet per Second.* | *Acres.* |
| 1837-38 ... | Spring Crop ... ... | 427·92 | 65,431 |
| „ ... | Autumn „ ... ... | 477·70 | 30,986 |
| | Total watered area in 1837-38 | ..... | 96,417 |
| | Total area protected from the effects of Drought or Famine | | 289,251 |

These last figures, representing 452 square miles of country, or barely the fifth part of the area of a single large District, indicate the entire protective influence of the Irrigation system in 1837-38 on the region between the Jumna and Ganges.

108. In 1860-61 the Ganges Canal had been added to the Eastern Jumna Canal with the following results:—

I.—EASTERN JUMNA CANAL.

*Statement shewing Volumes of Water and Area of Irrigation of the Eastern Jumna Canal during the Famine period of* 1860-61.

| | | Average Volumes available for Irrigation. | Area of Irrigation. |
|---|---|---|---|
| | | *Cubic Feet per Second.* | *Acres.* |
| 1860-61 ... | Spring Crop ... ... | 665 | 146,445 |
| „ ... | Autumn „ ... ... | 1,500 | 114,882 |
| | Total Watered Area in 1860-61... | ... | 261,327 |
| | Total Protected Area in 1860-61... | ... | 783,981 |

Thus, then, it appears that, during the twenty-three years which have passed since 1837-38, the capacity for Irrigation of the Eastern Jumna Canal has been raised from about 96,000 to 261,000 acres, or by 172 per cent, on the watered area of the earlier time. The area protected from the effects of Drought or Famine has risen from 450 to 1,225 square miles, equal to about half the area of one of the 1st class Districts of the Doab. There was, of course, no danger to any part of the produce from the watered area during the Autumn, the supply being then abundant. But during the Spring, the volume varied from 1,200, at the commencement of the season in October and November, to 415 cubic feet per second towards its close, or in the beginning of March. As the breadth of land sown corresponded with the maximum discharge, it was naturally feared that a large portion of the produce must be lost. But the completion of the Spring measurements has proved, that out of an area of 146,445 acres only 10,071 have been at all injured by want of water, and the injury extends no farther than to sensibly diminishing the yield, without destroying entirely the crop. I venture to ask special attention to the influence thus shown of scarcity in producing economy of water, as opening new views, and encouraging new hopes, as to the ultimate capabilities of these Canals of Irrigation. The ordinary volume available for the Irrigation of the Spring crop in the Eastern Jumna Canal may be estimated at 1,200 cubic feet per second. In years of average humidity, this supply will bring to maturity about 110 acres of Spring crops for each cubic foot per second. In 1837-38 the average volume available for the same crop was only 428 cubic feet per second, and its work then was represented by 153 acres of Spring crops brought to maturity. In 1860-61 the average volume was 665 cubic feet per second, and the effect produced is represented by 208 acres for each cubic foot of continuous discharge. The ordinary ratio

of work to volume has thus been doubled, and the ratio of 1837-38 increased by about 36 per cent. Yet it was matter of general comment that the Spring crops of the Famine Period on this Canal, surpassed in luxuriance of aspect, and weight of produce, those of ordinary seasons, and, with the exception of the small area previously referred to, the whole were brought to a safe and abundant harvest. With how much of personal toil and unwearying devotion on the part of Major Brownlow and his Assistants, these results have been produced, will be told more appropriately by their Departmental Chief; but having had some opportunities of learning personally the admirable system adopted in the distribution of the water, and having a cordial interest in the Canal on which all my own early experience was gathered, I cannot avoid this short reference to its rare success as a protective agent in times like the present. The views opened by the results of this success are very encouraging. It is, of course, admitted that few stimulants to economy of water can be equal to a Famine; but it is made clear by the results of this year, that considerably larger standards of work may safely be adopted than have hitherto been looked to. If 665 cubic feet per second can, under pressure, be made sufficient to ensure the maturity of say 130,000 acres of land under Spring crops, 1,200 cubic feet ought to be sensibly more effective than such a volume has yet been made in our past experience of ordinary seasons. The wastage of Canal water is then very great, and it may rightly be required that its future distribution shall be gradually approximated to the standard of 1860-61. I believe that the area of Irrigation of this Canal is still below the standard to which careful and efficient administration of the available supply of water in average years may bring it, and in estimating its ultimate value as a guarantee against the effects of Drought, I would take at least 850,000 acres, or about 1,320 square miles, as the total measure of its protective influence.

## II.—The Ganges Canal.

109. The actual effects produced by the Ganges Canal during 1860-61 are most inadequate measures of its prospective influence. During two successive seasons, one of scarcity of moisture, the other of absolute Drought, the head works of the Canal have failed to insure supplies of water at the most critical periods of the Autumn crops. The Spring crops have been fully provided for, but this is only half the work the Canal must do, and the Autumn supply must be made as little liable to serious interruption, as that for the Spring. It has only been since 1858 that cause has been given to doubt the permanency of supply. With that year the climatic disturbance which in 1861 rose, we may hope, to its maximum, began first to be felt. In previous years, as I can say from personal experience, the supply was at all times obtained with facility. In the cold season of 1858-59, however, it was not so, and the cause was, less from any difficulty in executing the necessary works, than from the diminution of the volume of the River itself. Although suspicion was then excited on this point, it was not till the succeeding year

that the matter assumed a serious aspect. The Superintendent General of Irrigation refers thus to the state of things then existing—

"The Rain-fall in the Doab during the year 1859-60 was much below the average; the rains were not only scanty, but they broke up unusually early; while the rain which ordinarily falls during the cold season failed altogether. In the beginning of September 1859 the volume of the Ganges began rapidly to decrease, and by the end of the month the Canal supply was nearly one-third short of that required for effective irrigation. Uncertain as we were whether the last floods of the season, often among the heaviest, were over, we felt a natural reluctance to commence the repairs of the costly bunds or temporary weirs at the head of the Canal, and thus the Canal was unable to meet the unusual demand for water which arose at the close of the (Khureef) Autumn season. Before the middle of November, however, the head works were restored, and during the remainder of the Spring (Rubbee) crop the Canal supply was efficiently maintained."

110. No time is so important to the final maturity of the Autumn crops, and the first processes of the Spring culture, as the two months which lie between the middle of September and the middle of November. No supplies of water, however profuse, can compensate for want of what the Farmer calls the "*pallaye*" or first watering preparatory to ploughing. To deprive him of that narrows his operations for the season exceedingly, and by the middle of November the time for it has long passed away. There will ever of necessity be risks connected with the administration of the Irrigation Department of Northern India. Casualties not merely of seasons, but of various other kinds must be anticipated from year to year, and without acceptance of the risks of loss involved in the measures needful to guard against them, it is impossible to adapt the system to the true wants of the country. There is, on the other hand, very great risk of destroying the confidence of the Agricultural classes in the efficiency of the Works as protectives to their crops, and in comparison with such an effect as that, moderate pecuniary savings are in reality noxious extravagancies. A very poor Autumn crop compared with what it might have been had the Canal supply been maintained effectively throughout the season, and a moderate Spring crop, represented accordingly the work of the Ganges Canal during the year immediately preceding the Famine. I do not find in the Reports of that year any specific statement of the area of Irrigation. But the means of approximating to it are given, and it seems to have been very nearly 130,000 acres.

111. From the close of 1859-60, however, the intensity of the Drought grew continually greater. The demand for water was incessant and universal. The possession of it, alone stood between the farmers and disastrous loss. The following Table of average monthly Discharges, for which I am indebted to Mr. Thomas Login, C. E., the energetic and intelligent Superintendent of the Northern Division of the Ganges Canal, will show at once how this great necessity was met. It may be noted that a constant supply of 5,000 cubic feet per second represents a state of full efficiency for Irrigation, as in the actual condition of the Dis-

tributory Channels, much more than that volume, even if it could have been had, could not have been utilised in 1860-61 :—

*Statement shewing average Monthly Heights of Water on the Guage at Roorkee, and corresponding Discharges of the Ganges Canal during the year* 1860-61.

| Year. | Month. | Monthly average Height of water on Roorkee Guage. | Corresponding average Discharge of Canal. | Standard Discharge for full efficiency in Irrigation. | *Percentages of variations. | |
|---|---|---|---|---|---|---|
| | | | | | Above * Standard. | Below Standard. |
| | | *Feet.* | *Cubic feet per second.* | *Cubic feet per second.* | | |
| 1860 | May .. | 5·66 | 5,080 | 5,000 | 1·6 | .... |
| | June .. | 4·96 | 4,443 | ..... | ..... | 11·3 |
| | July .. | 5·02 | 4,493 | ..... | ..... | 10·1 |
| | August .. | 4·15 | 3,691 | ..... | ..... | 26·2 |
| | September .. | 3·25 | 2,900 | ..... | ..... | 42·0 |
| | October .. | 4·99 | 4,471 | ..... | ..... | 10·6 |
| | November .. | 5·51 | 4,939 | ..... | ..... | 1·0 |
| | December .. | 6·52 | 5,849 | ..... | 16·9 | .... |
| 1861 | January .. | 5·66 | 5,074 | ..... | 1·5 | .... |
| | February .. | 5·60 | 5,020 | ..... | 0·4 | .... |
| | March .. | 5·57 | 4,993 | ..... | ..... | 0·1 |
| | April .. | 6·33 | 5,681 | ..... | 13·6 | .... |
| | May .. | 6·12 | 5,488 | ..... | 9·7 | .... |

112. This Table conveys at a glance the whole history of the action of the Canal during the Famine Period. Up to the end of July the supply was sufficient; but from the beginning of August to the beginning of October, when the fate of the Autumn harvest hung in the balance, and when every where beyond the influence of artificial Irrigation, it was being scorched into mere waste, the volume available ranged from 26 to 42 per cent below the needful standard. It is not in the Autumn Irrigation that any possible economy of consumption can be of much practical use. The most valuable products of that season must have full supplies of water at short intervals, or they certainly die. Rice, Sugar and Cotton, are among them, and whatever of Agricultural wealth these represent among the staples dependant on the Canal, was proportionally damaged by the inadequacy of the supply at so critical a time. From October onwards the supply was ample, and the action of the Canal most efficient and satisfactory.

113. During the months of January, February, and March 1861, the entire visible stream of the Ganges was turned into the Canal. A traveller could cross the River dry shod below the Weirs, and only a petty fraction of the volume escaped by leakage. I am aware of no instance in ordinary seasons, when the minimum volume of the Ganges at Hurdwar, has fallen below 8,000 cubic feet per second. In 1860-61 it did not exceed 5,600, of which about 300 were lost by leakage through the Head Weirs, and about as much more by percolation through the porous bed between Hurdwar and Roorkee, leaving 5,000 as the standard minimum available for Irrigation. There is nothing to justify the belief that in future years this standard will fail. All our knowledge of Droughts brings before us none more severe than those of 1837-38 and 1860-61, and we have, as has already been shown, safe grounds for thinking that in these years the exhaustion of the River had reached its extreme limits. There are, of course, possibilities of even greater exhaustions, and experience in other quarters is not wanting to indicate what their causes may be. The apparent exhaustion of the Indus, prior to those frightful Debâcles which restored the River to its natural state, exceeded anything ever known on the Ganges or Jumna. But we have as yet, at any rate, no historic trace or traditional record of the action of such causes as produced these derangements in the valley of the Indus, within the inner valley of the Ganges, and it is enough to deal with the results of our actual experience, without providing against events which, though physically possible, have never yet been heard of. I assume, therefore, that the minimum volume of 1860-61 indicates the utmost possible exhaustion of the River.

114. It will, no doubt, be observed that this minimum is sensibly lower than the volume taken by Sir Proby Cautley as the basis of his calculations for the Ganges Canal. That volume was 6,750 cubic feet per second at the head of the area of Irrigation, thus exceeding the River minimum by 26 per cent. It would seem as though nearly one-fourth of the estimated Returns must be deducted by reason of this difference. But when it is borne in mind, that the experience of Drought periods justifies the expectation, that reduced volumes of water will cover larger areas of Irrigation than under ordinary conditions, there seems little reason for any anxiety on account of the difference pointed out. I have no doubt myself that, when the apparatus of distribution has been brought to full maturity, the work done under the stimulants of a year of Drought, with an available volume of not less than 5,000 cubic feet per second, will materially exceed any standard which the Projector of the Canal ever thought possible. It has certainly been so on the Eastern Jumna Canal, where the mechanism of distribution is in the most efficient condition known to us; and I see no cause to look less hopefully to the future of the Ganges Canal, where the standard of efficiency is still far beneath its maximum.

115. The complete returns of the area of Irrigation on the Ganges Canal in 1860-61 have just reached me, through the kindness of Colonel A. D. Turnbull, Superintendent General of Irrigation. From those I learn that the whole area

watered during the Famine year, was 334,088 acres. The area protected from the effects of Drought would, therefore, be about 1,002,264 acres, or 1,560 square miles.

116. The condition of the Canal during the period when this effect was produced by it ought, however, to be distinctly borne in mind. None of its great branches were in action. All expenditure on these had of necessity been suspended under the financial pressure following the Mutinies. It was only as special Famine Relief works that two of them were resumed, and their influence on the area of Irrigation was of course unfelt. Even the execution of the minor distribution channels had been almost entirely suspended from the same cause, and although sanction to expenditure on these works, without limitation, was sent by the Government of India in May 1860, the work executed fell, of course, sensibly below the necessities of the case. Hence then the work done in 1860-61 is no adequate measure of the protective efficiency of the Ganges Canal, nor can the full extent of that efficiency be reached until the original Project is completed in its integrity. When so completed, the Irrigated area will rise to 1,471,500 acres, and the protective influence of the Canal will be felt over a total area of 4,414,500, or in round numbers 4½ millions of acres.

117. Summing up now the various details given in illustration of the protective influence of the existing mechanism of Irrigation, we obtain the following general result for the Doab:—

| | | Percentage of Total Area. |
|---|---|---|
| 1. | Protected by means of Irrigation from Wells ... ... | 24· |
| 2. | Protected by means of Irrigation from Jheels, submersion, natural moisture, &c. ... ... ... | 2· |
| 3. | Protected by the Eastern Jumna Canal ... ... | 4·47 |
| 4. | Protected by the Ganges Canal on completion of works ... | 24· |
| | Total Percentage ... | 54·47 |

118. Whence it appears that, on the data assumed, the existing means of Irrigation, carried to the largest extent of which they are capable, are only sufficient for the perfect protection from the effects of Drought and Famine of somewhat more than one-half the total area of the Doab, the proportions being 54½ protected and 45½ left unprotected. Even if it be thought that, in taking the Watered to the Protected areas as 1 to 3, an excessive proportion has been provided, it is yet certain that no safe proportion can be taken which will not leave a very serious extent of country still liable to the calamities against which we desire to protect the whole. Allowing the proportion to be diminished to 1 to 4, the Protected area would be raised only to about 70 per cent of the total area, leaving 30 per cent entirely unprotected. I am quite sure that, while the irrigated area need be in no higher proportion than 1 to 3 of the total area, it ought not to be in any lower for reasonable security than 1 to 4, and between these two limits of variation the question is practically confined. If the other strengthening measures recommended in connection with the Fiscal System of the Doab are allowed to operate, then I believe

the lower proportion of Irrigated area would suffice, because there may then be hope that Estates being in the hands either of thriving Communities, or single Proprietors possessed of capital, an emergency would be met by an instant extension of Irrigation from Temporary Wells or other means open to capitalists. But if things continue as they have been hitherto, I see no hope of immunity from the effects of Drought within any moderate time, with less than the larger proportion of Irrigated to total area first fixed.

119. Looking hopefully, however, to the use of all means calculated to add to the resistive power of Native society, I will consider the lower proportion of 30 per cent of the total area, as representing the breadth of land for which the provision of a sufficiency of irrigation is still indispensable to entire security. The area thus indicated would be very nearly 5¾ millions of acres, of which about 1,400,000 must be supplied with water. To do this through the agency of Wells would require about 65,000 Permanent and 270,000 Temporary Works of the class, implying an expenditure for the former of about 200 lakhs of Rupees, or £2,000,000, and for the latter of about 13½ lakhs, or £135,000. If the work were to be done solely through the agency of Temporary Wells, an expenditure of about 23½ lakhs of Rupees, or £235,000, would be required. But the works would not last on the average, more than four years, if made in the economical way supposed, and hence about Rupees 6,00,000, or £60,000, per annum would be added to the costs of culture.

120. Again, if Irrigation Channels have to be supplied, their aggregate capacity, even allowing for the influence of Drought periods, must still be sufficient to give a volume for irrigation about equal to the maximum provided for the Ganges Canal. At the cheapest rate which can safely be assumed, such a provision could not be made at a less cost than nearly 1½ millions sterling.

121. The most practicable means, however, of removing the risk remaining after completion of existing works, will probably be found in the combined influence of a farther extension of all three sources of Irrigation—in the extension of Permanent Wells by the proprietors of land where the physical conditions recommending their use are most favorable; in the increased capacity for extending Temporary Wells which will grow with the growth of wealth among the same class; and finally in the extension of Irrigation Channels by the action of Government, to such degree as available means permit. All needful and reasonable encouragement to the extension of masonry Wells may be given. They are certainly the safer guarantees against Drought, and in such seasons have a marked superiority over Temporary Wells, though for ordinary years the latter may be cheaper and even better. It is remarkable, however, how little external encouragement is required, if only the Public Demand has been lightly assessed. The District of Goruckpore, for example, has, within 12 years of ordinary character, increased its number of Wells from 32,845 to 41,637, or by 8,792, and its cultivation by 183,213 acres; and like indications will be found wherever the Settlement presses lightly. From the geographical position of the District named, water is probably not far from the surface; but supposing Wells to cost there only half the average

price, the results shown imply, that the Agricultural community have invested steadily from year to year, not less than 1¼ lakhs, or about £12,500, in increasing their supply of Irrigation from Permanent Wells. Any like investment in the Districts of the Doab would go far towards placing them well out of the remaining risk of Drought.

122. In considering the extent to which it may be prudent for Government to extend its works of Irrigation in the Tract under notice, it should be carefully noted, that none of the Rivers rising either in the Sub-Himalayan Range, or within the Doab itself, possess perennial supplies of water of any serious importance. Most of them are perfectly dry from September to June. It is probable that 350 or 400 cubic feet per second, about a third of the supply of the smallest of our first class Canals, would represent the largest volume that could be depended upon as a permanent supply for both crops of each year.

123. The Ganges and Jumna only can be rightly termed Irrigating Rivers, and they only will ever exercise any very important influence on the security of the Districts lying between them. So rapidly, however, do both these Rivers bury themselves in deep valleys, that their waters early cease to be available for Irrigation after they have left the near neighbourhood of the Mountains. Their valleys, too, are of such extent, and in many localities so densely populated, and so well cultivated, that such Works as would raise the surface levels sufficiently to make it possible to deliver water on the Doab, are almost shut out from consideration, by reason of the destruction to property which they would cause. From 50 to 70 feet represent the general depth of the great Rivers beneath the surface level of the country, and from 1½ to 6 miles represent the width of the troughs or valleys in which they flow. Under these conditions the prospect of making more of these Rivers than has already been made is not encouraging. At the same time the question has never been systematically examined. The information available is fragmentary and incomplete. Using it as well as I could, I have come to the conclusion at present, that no Works directed to the delivery of water on the high levels of the Doab, from any points on the Ganges or Jumna more than twelve or fifteen miles below their respective places of departure from the Mountains, are likely to be financially practicable. Physically practicable of course they are, but Dams of such magnitude would be required across the Rivers, and Channels of such depths through the high lands, that the cost would counterbalance the gain so greatly, that it would probably be idle to think of executing them. But I would gladly see the matter submitted to intelligent examination, as it may be that the imperfection of our present knowledge has led to narrower views being taken on the question than are right. Beyond enquiry of this kind, however, it would not be prudent to carry any present recommendations.

124. Admitting the imperfections of the minor River lines as means of Irrigation, I am still of opinion that considerably larger use might be made of them than at present. In those which have small perennial supplies, or are directly connected, or may be connected, with the Canal system, such as the Hindun,

the East and West Kali Nuddies, the Easun, the Pandoo, the Rhinde, the Syngoor, and several others, I believe that, under a proper system of supervision, the whole of the cold weather supplies might be fully utilized in the Irrigation of their own valleys. The effect would not be great, but probably from 130 to 150,000 acres might in this manner be watered, and half a million in all, protected from the effects of Drought. The Autumn supplies might be much more largely employed, and though they would be useful only in one harvest, still it is no trifling gain to guarantee even one harvest from complete destruction. By a carefully supervised system of Dams in these River valleys, with connected channels, I think it might be found practicable to store and issue water enough, to carry the local Autumn crop through even a very bad season, and the practicability of doing so is well worthy of careful examination. There is, even in the worst season of Drought of which we have yet had experience, a large volume of water available. I estimate the outfall of drainage water through the various drainage lines of the Doab, during the rainy season of 1860-61, miserably defective though it was, at not less than 15,000 cubic feet per second, between the beginning of June and end of September. In ordinary years the volume is four or five times as great; but even the minimum shown above, is more than double the volume required to place the unprotected third of the total area of the Doab, beyond the risk of farther suffering from Drought. The problem is, to store and distribute this volume in such manner as best to meet the wants of the Farmers. The question is not one, of course, that can be disposed of without close and careful local enquiry; but I would be very much disappointed if such enquiry did not result in the beneficial employment of a very considerable portion of this water, which now runs wholly to waste. I venture, therefore, to commend the farther use of the minor Rivers of the Doab, as a subject likely to repay examination. By the development of the means indicated, I see cause to believe that, whether the unprotected area of the Doab be taken at 30 or 45 per cent of the entire surface, there exist sufficient means for placing it, in the course of time, altogether above the destructive influence of future Droughts.

125. For the thorough protection of that Section of the Doab within which the Canal system now operates, some instant action appears to me to be quite indispensable. It is of the deepest importance to the interests, both public and private, involved in the Ganges Canal, that the entire scheme should be finished and brought into full work. As long as it continues bare of its best and most profitable branches—narrowed in the sweep of its action over the face of the country by want of its complete apparatus of distribution,—burdened by the heavy load of all its most costly Works, while debarred from the full gain those Works were constructed to insure—so long must its progress cause disappointment to the Community in general, and its influence seem to fall far below the anticipations of those, who measured that influence by the largest capabilities of the Scheme. I would, therefore, most earnestly recommend as wise, prudent, and necessary to the security of the Doab, that the whole of the still incompleted portions of the Ganges Canal should be systematically carried on, till they have reached their full development as Irrigating lines.

126. It is evident, however, that such development will be very imperfect so long as one harvest of each year is exposed to the casualties of the Autumn crops of 1859 and 1860, by reason of defective control over the River supply. The establishment of an easy and certain command over that supply is essential to the efficiency of the Canal as a protective agent; and the more promptly the needful works are sanctioned and executed, the more satisfactory will the results be. It was with the view of making myself acquainted with the designs for this object that, in company with Colonel Morton, Deputy Superintendent General of Irrigation, and Mr. T. Login, Superintendent of the Northern Division, Ganges Canal, I visited the Head Works of the Canal in June last; and although I do not presume to express a final judgment on Plans which were then only in course of completion, I have no doubt that the general scheme will prove practicable, and that its cost will not exceed the limits reasonably allowable, in securing so great an object as a supply, virtually invariable at all seasons of the year. The Works as projected on the most complete scale, and anything short of such a scale will, I fear, prove a failure, are not likely to cost more than 10 lakhs of Rupees, or £100,000. The actual estimate is considerably below this amount, but the work is difficult, and the contingencies are many. It is well, therefore, to allow a large margin. The Agricultural property dependant on the Canal already amounts to very close on one and a half millions sterling of annual value.* It will rise in time, if the Agricultural community find they can rely implicitly on the virtual permanence of the supply, to fully Six millions. The cost of securing this permanence would, therefore, be equivalent to an annual insurance charge of about one-half per cent on the present, and one-eighth per cent on the prospective annual value of the property insured. These details may show that the expenditure proposed is not extravagant; but the true state of the case seems to me to be, that without this expenditure, be it moderate or immoderate, the action of the whole Canal will be imperfect; the confidence of the people in its protective powers cannot be complete; and in every season of extraordinary aridity the supply will fail, just when water is most precious. Under these conditions, I feel no hesitation in respectfully soliciting the favorable consideration of the Government of India to the project for Permanent Head Works to the Ganges Canal, when it shall be submitted by the Superintendent General of Irrigation, North-Western Provinces. In connection with its action as a Canal of Irrigation, the Ganges Canal calls for no further remarks in this place. When the question of Communications comes under notice, it will be necessary to recur to it; but meanwhile the completion of the original project in its integrity, and the addition of permanent works of supply, are the most urgent and important extensions of the Canal system, required within the Doab.

127. Crossing now to the West Bank of the Jumna, the materials for estimating the comparative areas, protected and unprotected, are by no means so plentiful, or so reliable, as in the older Districts of the Doab.

* In Appendix No. IV will be found a Statement of the value of Crops grown on Land watered by the Ganges Canal in 1860-61, based on actual measurements just completed.

128. In 1837-38, the only Canal of Irrigation in this tract of country was the Western Jumna Canal, and for that year, the area of Irrigation dependant on its waters, is shown in the following Statement:—

WESTERN JUMNA CANAL.

| | | Average Discharge per Second at head of Irrigated Tract. | Area of Irrigation. |
|---|---|---|---|
| | | *Cubic Feet per Second.* | *Acres.* |
| 1837-38 ... | Spring Crop ... ... | 1,678 | 199,375 |
| „ ... | Autumn „ ... ... | 1,591 | 108,670 |
| | Total Watered Area in 1837-38 ... | ... | 308,045 |
| | Total Protected Area in 1837-38 ... | ... | 924,135 |

The work done during this Famine period is represented by the following areas under crop, being brought to maturity:—

| | Per Cubic Foot per Second. |
|---|---|
| Spring Crop ... ... | 119 Acres. |
| Autumn „ ... ... | 68 „ |

The total area protected was as above 924,135 acres, or about 1,440 square miles.

129. In 1860-61 the same Canal irrigated the areas shown below:—

| | Area of Irrigation. |
|---|---|
| | *Acres.* |
| 1860-61, Spring Crop ... ... ... | 169,306 |
| „ Autumn „ ... ... ... | 288,985 |
| Total ... | 458,291 |

I regret very much that the average volumes of water in this Canal, during both seasons, should not have been sent to me, as I am sure they would have shown very strikingly, the influence of Drought in producing economy of consumption among the users of the water. The general results have, however, no doubt, been much the same as East of the Jumna. The total area protected by the Western Jumna Canal during the Famine must have been not less than 1,374,873 acres, or about 2,150 square miles.

130. Between the Jumna and the Sutlej, the Western Jumna Canal stands as yet alone as a protective agent of serious importance. About 10,000 acres of land precariously supplied from the drainage waters of the Nudjifghur Jheel near Delhi—a few patches of cultivation under small Tanks in the same neighbourhood or in Goorgaon—about 25,000 acres watered by simple submersion, in the Agra District, and a merely nominal area in connection with the Bundelkund works, the whole falling under 40,000 acres, represent the maximum area, for which water in any form has been provided by the action of the Government. Even over this small breadth, the supply cannot in all cases be depended on, so that, practically speaking, it may be said that the whole Tract, excepting only the portion traversed by the Western Jumna Canal, waits the execution of Works needful to its security against Drought.

131. I find myself incompetent to measure, as in the Doab, the probable area protected by Well Irrigation. No such returns illustrating this point in the Punjab, as in the North-Western Provinces, have been accessible to me. It is only for the Districts forming the Delhi and Hissar Divisions, that I have been able to obtain any materials in detail. For the Cis-Sutlej Division they are very imperfect. Making, however, the best estimate I can from these data, it does not seem likely that the area watered by Wells, or Rivers, or such means of Irrigation, other than Government works, as exist within the Section of the Punjab under reference, can exceed about 750,000 acres, giving a total protected area of say 3,500 square miles. Canal and Well Irrigation together may, therefore, be considered to have placed beyond risk of Drought or Famine, a Section of the country between the Upper Sutlej and Jumna of about 5,600 square miles in area. The whole area of the tract of country referred to, however, is fully 20,000 square miles. So that about 28 per cent only can be regarded as at this time fairly beyond the vicissitudes of season. Much of this area is doubtless but sparsely populated, as its precarious position would lead us to expect; but within it, are vast breadths of the richest soil, waiting only for a steady supply of the means of Irrigation, to become both populous and productive. Experience in Hurriana, which was an absolute desert at the beginning of this century, shows conclusively how sure this effect is; and the existence of the Western Jumna Canal in that region, has called into being, it may almost be said, both population and culture. The importance of placing as large a section as possible of the still unprotected area here, in a condition of security, will, no doubt, be readily recognised.

132. Among the means of doing so, the first that naturally presents itself is the improvement of the existing means of Irrigation to the utmost practicable extent. The Western Jumna Canal, in watering during the Famine Period of 1860-61 very nearly half a million of acres, and supplying food grains, moderately estimated at five millions of maunds,* has doubtless done noble work. But it is well known that its capacity is even greater than these illustrations of it would indicate. Its channels and its means of distribution admit of much improvement, and for years past these improvements have been subjects of discussion. It may be hoped that they will now take definite form, and before long be carried out, for I am thoroughly convinced, that no money could be better invested than in extending the capabilities, and correcting the imperfections of this most valuable Work. In 1837-38 the two Jumna Canals were provided with means of distribution much of the same kind, and in reference to their comparative magnitude, they had defects of channel to much the same extent. From that period almost up to the present time, a steady and considerable expenditure has so improved capabilities, and rectified defects on the Eastern Jumna Canal, that between the two Famine Periods, its area of Irrigation has increased by 172 per cent, and its capacity of distribution has rather more than doubled. On the Western Jumna Canal the increase of Irrigated area, during the same time, has been about 48 per cent, and the increased capacity of distribution about one-sixth only. There has, therefore, been an ample return for the heavy outlay on the one Canal, and

* About 6½ Millions of Bushels.

there is great encouragement from the results, to proportional outlay on the other. That outlay must be large to be effective, but the prospects of returns are great too. In 1860-61 the water rent on the Western Jumna Canal touched very close upon 4½ lakhs* of Rupees, or £45,000. The re-adjustment of the bed levels, and the improvement of the means of distribution, might be expected to raise this income to 6 lakhs, or £60,000. The Civil Commissioner, who in 1856-57 investigated the condition of the Estates in the bad parts of the Canal, reported that 3 lakhs per annum of Land Revenue were in jeopardy, from the deterioration of the productive powers of the land. To guard against this loss, and to secure the increased Canal Revenue, would justify an expenditure on rectifications and improvements, of about half a million sterling, and I feel very confident that all desirable objects could be attained at a cost even less than this. But were this sum to be expended, the direct returns on the increased capital would still be sufficient. The cost of the Canal would then have been in all, 66 lakhs; its annual Revenue from Water-rates would rise to 6 lakhs; 3 lakhs more of Land Revenue, now in danger, would be saved. Taking its annual charges at 2 lakhs, a return of about 10½ per cent would be secured, irrespectively of the increase which the Land Revenue Officers might consider themselves justified in taking from Estates, in the unexceptionable parts of the Irrigated tract. I need not say more here on this subject; but I do most earnestly hope that, whenever means can be made available for perfecting a Work so capable of great effects as this Canal, its claims may not be neglected. When fully developed, I would expect its protective influence to be perhaps one-fourth greater than now, thus extending over an area of about 2,750 square miles.

133. In Umballah, Thanesur, Delhi, and Goorgaon, some additions to the general area of Irrigation, either from the Rivers which traverse these Districts, or from Tanks which may be constructed within them, may doubtless be made. But such extensions are not likely to be of any great magnitude, and they may be left to be worked out from time to time, as the Local Authorities suggest.

134. The remaining great source of security to the upper section of the Tract now under notice, is the employment of the River Sutlej for purposes of Irrigation. The practicability of so employing it has long since been demonstrated by Colonel Baker, and the necessity for its aid is now so urgent and plain, that I need do little more than draw attention again to the subject.

135. The Sutlej has the characteristics of a first class Irrigating River. Its volume is subject to no greater fluctuations than the volumes of the other Rivers rising in the Central Himalayas. It is altogether improbable that, in the worst Drought we can have, it will lose more than about one-third of its ordinary minimum discharge. That discharge has been ascertained to be very nearly 5,000 cubic feet per second, and a reliable volume of 3,250 cubic feet might, therefore, always be had from this stream. Such a volume duly distributed, as the Jumna Canal supplies were in 1860-61, would be found sufficient for an area of Irriga-

* The actual amount is Rupees 4,41,712-13-11.

tion of about 900,000 acres, and would insure against the effects of Drought a tract of country having a total area of not less than 4,220 square miles. Colonel Baker estimates the cost of a Canal from the Sutlej, carrying 2,500 cubic feet per second, at 25 lakhs of Rupees, or £250,000. I would increase the volume by 30 per cent, and the probable cost by 100 per cent, making the one 3,250 cubic feet per second, and the other 50 lakhs, or £500,000. I doubt whether such a volume can be delivered, over such a country, at a less cost, for Works of every class, than about Rupees 1,500 per cubic foot of continuous discharge. The Returns can readily be judged of from those of the Jumna Canals during the past year. I find that these have been in round numbers—

For the Spring Crop,—Rupees 200, per cubic foot of continuous discharge.

For the Autumn Crop,—Rupees 80, on the same standard.

So estimated, the ultimate Returns for the Sutlej Canal would stand thus:—

| | | | |
|---|---|---|---|
| Spring Crop | ... | ... Rupees | 6,50,000 |
| Autumn „ | ... | ... „ | 2,60,000 |
| Total Annual Revenue | | ... Rupees | 9,10,000 |
| *Deduct* | | | |
| Total Annual Charges | | ... „ | 2,50,000 |
| Ultimate Net Revenue | | ... Rupees | 6,60,000 |

This would give a return of about 13 per cent on the capital, which is about the ordinary return given by fully developed Canals of Irrigation of this magnitude.

136. The Sutlej Canal would traverse parts of the Districts of Umballah, the Pattiala Territories, Hissar, and Bhuttiana, thus including a section of country in which the strengthening effect of a Zone of prosperous Irrigation, would be of inestimable importance. To a large portion of this section, the following descriptive details, written more than twelve years ago, continue as appropriate as ever:—" It is a bleak, wretched, and without water, a most sterile land. The wells are so deep that artificial Irrigation from them is impossible; the water is so brackish and impure, that none save Natives of the Tract can drink it with impunity; rains are scanty and precarious; vegetation is represented by a few stunted thorn bushes, or a temporary crop of grass, scattered over the great parched plains. Under circumstances so ungenial, the population is necessarily scanty and lawless, deriving their subsistence from herds of cattle, and addicted to the marauding habits common to pastoral tribes.

" The question here is, therefore, not to improve Agriculture, but to create it; not to provide, as in the country between the Rivers Jumna and Ganges, for the casual occurrence of an unfavorable season, but for that deficiency of rain which is the rule and not the exception; and finally, to enable an extensive and capable province to become, by its increased resources and the progressive improvement of its inhabitants, a source of strength and revenue to the State, instead of being, as now, a burthen and weakness."

This description applies chiefly, to the Southern part of the Tract which would come under the influence of the Canal, but for the whole, the existence of such a source of strength and security would be of the very highest value.

137. The proportion of the whole area of the Punjab Section under notice, which would, by these various means, be secured against the effects of Drought, would be very nearly 50 per cent. But of the unprotected portion, the barren waste represents a very large share. The cultivated or culturable land may be approximately estimated at 13,000 square miles, and for a little over 10,000 square miles a sufficient provision for Irrigation will have been made, when the Works suggested have been completed. It is not at all necessary to suppose, that a Canal from the Sutlej at a high level will exhaust the capabilities of that River for Agricultural purposes. Such a Canal would be the first and best use of its waters, but hereafter it may become both expedient and practicable, to draw other lines from lower levels, which, though not so efficient, nor so reliable in their action, may still become very valuable, and give additional guarantees for the security of the Tract. If, however, the Western Jumna Canal be remodelled, the Sutlej Canal executed, and such farther use made of the waters of minor Rivers, whether for direct irrigation of the lands on their banks, or for the supply of reservoirs, as may be found practicable, the gradual extension of Irrigation over the remainder of the country, may safely be left for future consideration.

138. As regards the capabilities of the Section of the North-Western Provinces West of the Jumna, there is not much to be said. Muttra on the right bank of the River, seems almost hopelessly out of the reach of the means of Irrigation, otherwise than by Wells. I cannot see how it could be supplied with Canal Irrigation at any reasonable cost. Though the District is one of those in which the number of masonry Wells has diminished since the Settlement, it takes a fair position among the improving Districts, and shows an increase of cultivation of upwards of 8 per cent. My knowledge of this Section of the District is not intimate however, and there may possibly be some sources of minor River Irrigation which are unknown either to myself, or the Collector, whom I consulted on the subject. Southwards in the Agra and Allahabad Divisions, every thing yet remains to be done. A few Works have been constructed in the District of Agra and in Bundelkund; but their influence, as I previously mentioned, is absolutely insignificant. There are, however, considerable capabilities in this region. It has some Rivers, which, though scarcely to be called perennial, have small volumes in the Spring, and great ones in the Autumn. There are noble sites for large artificial Lakes in many localities, and numerous means of feeding them. Its condition generally, however, is at present matter for enquiry rather than suggestion. Much may unquestionably be done for the country, but a thorough examination of it is a necessary preliminary to any action, and such an examination would, I am confident, from my personal knowledge of the Tract, amply repay whatever of cost or labor it might entail.

139. It only remains now to sketch the capabilities of Rohilkund. Here it

was at one time thought, that artificial Irrigation was not very important. The natural conditions of moisture of climate and sub-soil prevailing in the Province, seemed to place it above the necessity for such an aid to Agriculture. But I believe I do not misstate the views of the Revenue Officers when I say, that this impression has passed away, and that a very earnest desire to secure for their Districts the benefits of Permanent Irrigation, is now universal among them. Even in average years, the staples of the Province, Rice and Sugar, would always be safer, and sometimes better by the means of Irrigation being at command. In years that vary from the average towards dryness, or even show irregularity of Rain-fall only, crops so sensitive to want of water as Rice and Sugar-Cane are sure to suffer. In years of Drought their destruction is, of course, more assured than that of the hardier cereal grains. Hence there has been of late years, a growing demand for the increase of means of Irrigation in Rohilkund, intensified greatly as is natural, by the effects of the calamity now passing away.

140. The Province has considerable capabilities, and the demand for increased protection may be met to an important extent. I have already had occasion to mention that Well Irrigation can scarcely be said to exist. 582 Wells, giving employment to 919 Irrigating machines, represent the whole mechanism of Irrigation from this source. In 1860-61 the Canal Irrigation extended over 91,995 acres, on which were reared crops of the value of Rupees 39,31,218, or £393,122. The Canals, whence the water for this area is derived, are virtually concentrated in the District of Bareilly. To all practical intents and purposes, means of Irrigation have to be created elsewhere. The supplying Rivers are all small, and their volumes not absolutely certain, though rarely failing wholly. The number of such Rivers is very great. There is considerable use made of their waters by the Proprietors of the land on their banks, and a very complicated system of private water rights has gradually grown up among the people. There is still, however, a large field for the beneficial employment of the minor Streams, which spread in a perfect net work over the country, and may be turned to good account in each of the Districts of the Province.

141. But it is from the greater Rivers only, that supplies can be obtained, of magnitude sufficient to feed large Canals. I have a strong impression, though it is unsupported by any levels, that the Ganges might be turned to account for the Irrigation of part of the Bijnore District. I would be glad to hear of the practicability of this being determined by actual survey. About 1,000 cubic feet per second thrown into that District would almost secure it against future serious injury from Drought; and if the levels proved favorable from some point considerably below the Ganges Canal Heads, such a supply might be available in all years, as the percolation through the boulder bed of the River is always great.

142. In 1856-57, I had the River Ramgunga carefully examined, and a project for a Canal from it was then prepared by Mr. James Parker, Superintendent of the Upper Central Division, Ganges Canal. The lowest known volume of the River proved to be about 500 cubic feet per second. In such a year as 1860-61,

however, this supply could not be depended on in full. Judging from the contraction during that year of other Rohilkund Rivers, of which the volumes were actually measured, not more than 350 cubic feet per second could be assured. There are serious professional difficulties connected with the project: its cost would be great, and the stability of some of its most important works precarious. It would be well, before coming to any decision, to ascertain whether the water could not be better used on the left than on the right bank of the Stream. As yet it is of the latter only, that detailed examination has been made. To use the Stream for the irrigation of the country on one or other of its banks would be most desirable, and as the ground at the base of the Himalayas near the dèbouche of the Ramgunga, has excellent sites for storage reservoirs, the great supply of the Rainy season might there be gathered, and retained for use during the Spring.

143. The only other large Stream whence a supply might be drawn, is the Sardah or Gogra on the extreme Eastern frontier of the Province. We as yet, however, know nothing of the capabilities of this River, beyond the general fact that it possesses the main characteristics of a first class irrigating Stream. Its supply is large and constant, and it may be inferred that its levels are good. But all these points wait investigation, and it is sufficient at present to indicate the expediency of this being made.

144. Chart No. IX. has been compiled so as to bring under the eye at one view, the different details scattered through the preceding paragraphs. Summarily stated, the general results are, that, within the geographical limits defined, an aggregate volume of water is available for irrigation, by the use of the ordinary means of collection and distribution, which may be estimated roughly, at about 10,000 cubic feet per second. That the gross annual value of this volume may be taken, for Famine Periods, at not less than 280 Rupees per cubic foot per second, and for ordinary periods, at about Rupees 200, or in round numbers 25 lakhs, or £250,000 per annum. Of this gross annual value a third would be absorbed by costs of maintenance of the works, while about two-thirds would be available as interest on the capital sunk in their original construction. It will be found that, allowing 12 per cent of interest, the *net* annual value of this source of Revenue and Security would justify the expenditure of rather more than Two millions sterling of capital. Such an expenditure, cautiously and systematically made, would so endow the Tract of country under reference with works of Irrigation as to raise it, almost, if not altogether above the vicissitudes of season.

145. The order of importance, in which the different Works referred to seem to me to rank, is as follows:—

1*st.*—The completion in its integrity of the original project for the Ganges Canal.

2*nd.*—The rectification of the Western Jumna Canal.

3*rd.*—The steady extension of all the existing minor Channels of Irrigation, so as to make their protective influence as large as possible.

4*th.*—The execution of the proposed Sutlej Canal.

*5th.*—The examination of the three main Divisions of the Tract, *viz.*, 1*st* that West of the Jumna; 2*nd* that between the Jumna and Ganges; and 3*rd* that East of the Ganges; with a view to the accurate determination of the farther capabilities of their Rivers and Streams for use in Irrigation.

I am well aware that to carry out designs such as these can only be a work of time, and it is possible an irresistible necessity may require that, even while their importance is most fully acknowledged, their execution must be indefinitely deferred. I believe, however, that it is in the spirit of my Instructions that such an outline of work to be done should be submitted, and I earnestly hope it may be practicable to proceed with at least its most pressing and necessary parts, in such time as to interpose them soon, between the people and any future calamity of the kind we have just had to deal with.

146. But, however important it may be to proceed with the execution of Works of Irrigation, it has now become quite as important to great social and public interests, that the general principles on which the Irrigation Department is conducted should be investigated, and, if found susceptible of improvements, should be improved. So long as isolated parts of a few Districts only were affected by the system, its Administration was comparatively unimportant. But that time has passed away. The influence of the Famine has given a vast and sudden development to the sphere within which the Irrigation System acts. It is, as I have had to shew, producing an almost revolutionary effect on the relations of the land to Public taxation. It is changing the relative values of Property over some of the richest, and most important Districts in Northern India. It is affecting for good or evil, the personal interests of seven or eight millions of men, and it is now in that most important of all stages of progress, when a true and safe form can be given to it, and sound principles impressed upon it, without violent disturbances either of rights or feelings. The question was, therefore, constantly under consideration during the time spent in the Famine Tract, and, in passing from District to District, I endeavoured to collect, with all practicable accuracy, information on each of its most important aspects. In giving the conclusions to which this course has led me, I need scarcely say that they concern exclusively the System and its principles, and can only be perverted by being made matters of personal reflection.

147. Our present Irrigation System is not, correctly speaking, a creation, but only a restoration and extension of one that had existed in some considerable vigour, for three or four centuries of the Mahomedan period. When, therefore, the Canals of the Jumna were restored, between 1817 and 1830, many old rights temporarily dormant, and many old customs temporarily disused, but of which village tradition, or occasionally actual records, had preserved the memory, sprung again into vitality. The methods of internal distribution of the water; the manner of paying the water rent; provision for passing water-courses through adjoining lands; and numerous other matters; gradually took form either from old habits, or under new needs.

148. Thus it has happened, that during the forty years which have since passed, a varied and complicated, but as yet an altogether unrecorded and unsystematised mass of rights and practices has grown up, of which little in detail is known by the Irrigation Officers, and still less by the District Officers. The partial identification of Canal and Land Revenue in the last Settlements, and the extension of the same process in those now in progress, have given permanence to such rights, and have made it a matter of great importance that they should be investigated and recorded. I have reason to know that serious confusion is beginning to arise, from the separate action of the two Departments in relation to such rights. The Collector, acting as Settlement Officer, upsets decisions of the Canal Officer affecting rights to water, and there being no authoritative record to refer to, all parties are dissatisfied. The state of things is indeed in kind, though happily not in degree, similar to what I have already described as prevailing, before the present Land Revenue Settlement System was introduced; and if the incipient confusion be neglected, I have no hesitation in saying it will end in evils of serious importance. The formation of a Village Record of rights in water, analogous to the Record of Rights in land, is, therefore, I conceive, the first point in connection with the Irrigation System, that needs prompt attention.

149. The reference above made to the separate action of the Land Revenue and Irrigation Departments and its effects, leads to the examination of the actual relations between them. It can scarcely fail to be seen, that the connection of the Irrigation Department with the Land Revenue is so intimate, its influence so direct, and its points of contact so numerous and varied, that the two Departments, though separate, are really identical. They are but branches of the same great section of the Administration, and their present separation is, I think, injurious to the action of both. The ignorance of the District Officers of the whole interior economy of the Irrigation Department is, as they have themselves without exception assured me, entire. No information regarding its principles or forms or effects is ever communicated to them. Yet they must of necessity be in frequent need of such information, and in view to the great growth of the Irrigation System, and to its influence on Revenue, Rent, and Value of property, it seems quite impossible that the existing system can be permitted to continue in force.

150. On the other hand, the Canal Officers are quite as ill-informed on matters connected with the Land Revenue, though they too are in constant need of such information, and would find their efficiency greatly increased by having it readily at command. The position of these two Departments, the one fixing, collecting, and regulating the Land Revenue, the other stimulating its growth and securing its stability, is, therefore, one of complete isolation; and it is fortunate when this isolation, from the confusion of powers and duties involved in it, does not pass into a state of direct antagonism. I am strongly of opinion that this state of things should cease; and that the Departments, being identical in fact, should be made so in form.

151. But I would not make this identification in the Executive Sections, or by subordinating the Irrigation to the District Officers. This would never work

well. The functions of the Officers of the two branches are capable of precise definition. They need separate qualifications, and independent professional knowledge. Each would be more efficient by knowing what the other is doing, in so far as that action affects his special work; but neither could control or direct the special work of the other. The identification should be made, I conceive, in the Controlling Authority, whether that be represented by a Board, or a Commissionership, or a Secretariat of Revenue. There is, of course, no practical difficulty in so strengthening any form of Controlling Authority as to make it competent to the direction of the work of both the branches of the Executive Revenue duties; and if I speak of a Board hereafter, it is not from any preference to that form, but merely because it is the actual form in the most important region of Irrigation under notice.

152. It appears to me, then, that so soon as Canals of Irrigation begin to act on the Land Revenue, they should immediately come under the direction and control of the Board of Revenue, strengthened by the addition of an Irrigation Member.* The separate Central Office of the Irrigation Department should cease, and should form the Irrigation Section of the Office of the Board of Revenue. The Superintendent General of Irrigation would be absorbed into the Board, and his functions of inspection would be performed by the Irrigation Member on deputation during the cold season. The geographical extent of the Irrigation System is now such, that I am satisfied, the interests both of Government and the people would be promoted by the local supervision being divided between two Officers, instead of being concentrated in one. These gentlemen would be "Commissioners of Irrigation" under the Board; but if at first one only were appointed, his attention should be restricted exclusively to the Ganges Canal, and the Executive Officers of other Canals should communicate directly with the Board. It is physically impracticable for one man to do more than control the operations of the five Divisions of this Canal, affecting as it does the interests of a dozen separate Districts or Sections of Districts.

153. Consequent on this subordination of the two Sections of the Revenue Department to one common Head, much simplification and considerable economy would be practicable. Double Collection Establishments, as now maintained, might be modified. All duties of collection in the Irrigation Department might at once be transferred to the Collectors of Districts, the Irrigation Officers retaining their special functions of fixing the water-rate (so long as a separate wate-rate continued to be levied), maintaining the works, and regulating the distribution of the water. The Irrigation Member of the Board would take care that all needful information on Land Revenue questions as affecting their duties, reached the Canal Officers, and the Land Revenue Member would take the same care for the District Officers, in reference to Canal questions. Both classes of Executive Officers, feeling their reputation to be concerned in a common issue, might be expected to co-operate heartily, and isolation and antagonism would pass away. The growth of the Irrigation System would be watched by a body so constituted, as to see at once its tendencies and effects; to correct them when mischievous; to stimulate them

* The Construction of the Works up to the time of admission of water might easily, if desired, be independant of the Revenue Authorities, as their interest does not begin till the Land is affected by actual Irrigation.

when good. The organisation suggested seems in truth to be the natural one in such a case, and I believe that, in action, it would be found both harmonious and effective.

154. Its best effects, however, would be felt, in the facilities it would offer for the application in the Irrigation Department, of those same broad and fertile principles which have already been partially introduced into the Land Revenue System, and the farther extension of which has been so earnestly recommended in a previous part of this Report. I am aware of no sound reason why Irrigation Revenue should not be dealt with, as it is proposed to deal with Land Revenue. Fixity of demand is just as essential to growth, just as likely to be highly appreciated, just as sure to be successful in the one case, as in the other. To fix the Public Demand on the Water, first for a period, so as to make sure of a light, equable, and fair assessment; and then in Perpetuity with power of redemption, will stimulate growth in Irrigation, and with it growth in most of the elements of material prosperity, as certainly as like dealing with the Demand on the Land, will stimulate culture generally.

155. It is no new or untried view which is embodied in the above statement. It is the basis of the marvellous development of Irrigation in the rich plains of Lombardy and Piedmont, watered by the Ticino, the Adda, the Dora-Baltea, the Sesia, and many other Alpine Rivers. I saw much of the landed Proprietors of this magnificent region, and they uniformly attributed to their ability to purchase from the Government, the right in Perpetuity to such water as their Estates required, the great extensions they had made in Irrigated culture. It is natural that it should be so. The perpetual interference of Government Officials is harassing, even when it is honest and well meaning. Constant fluctuations of Demand destroy all feeling of Proprietary right. The absence of this sense of right induces reckless waste of the water. The temptation to escape additional payments infects the Farmer with the spirit of gambling, and he stakes his crops constantly, against the chance of a favoring shower. It takes away all these motives to irrigation or folly, to make it practicable for men to acquire the absolute right of property in the Water they need, on terms fair to Government and to themselves. There is scarcely a cubic foot of water in Northern Italy that now continues to be Government property, yet nobody having any knowledge of the Public Revenues of the Milanese or the Lumellina, would ever dream of asserting, that Government had done otherwise than wisely in alienating this rich property. It would have been rich, no doubt, even under a Government administration, but it has been richer far, when administered under the intelligent self-interest of private Proprietors.

156. Holding these views thus strongly, and having anxiously endeavoured now six years ago, to prepare the way for their being worked out in the Administration of the Ganges Canal, it would have been matter of the deepest regret to me if I had been obliged to state without qualification, that the latest proposition regarding the Fiscal Principles to be adopted on that Work, is to abandon the

idea of fixity of demand, to give up the attempt to issue water by specific volumes, and to adopt the plan of Half-yearly Settlements.* Happily, however, it is unnecessary for me to do more than merely allude to this unfortunate proposal, since it has been disapproved of by the Government of the North-Western Provinces, and rejected by the Government of India, on grounds showing so clear a perception of what appear to me to be the only right principles for a great Irrigation System, that I am relieved of all anxiety on the subject, and may pass on at once, to the matters still remaining for consideration under this head.

157. I believe that sufficient general explanations have now been given to admit of my detailing the means, whereby it appears to me that the interests of Government in the Irrigation Department may be so guarded, as to insure their being no obstacle to the Perpetual Settlement of the Land Revenue. To this end it is first necessary, that a broad distinction should be made and borne in mind, between Irrigation Works now in action, and in every case more or less identified with the Land Revenue System; and Works which may hereafter be executed, and may be kept entirely clear of that System. It is evidently most desirable that a field should be opened for the action of private enterprise in this direction; and by keeping future Works clear of all connection with the Land Revenue, there will be no real difficulty in devising plans whereby this object may be attained, with security to all interests involved. But for the moment I direct attention solely to the first mentioned class of Works, as it is by them only that any obstacle to the fixture of the Public Demand on the land for ever, is held to be created.

158. I have already explained the manner in which the Canal and Land Revenue Systems have become partially interwoven. The Settlement Officer, as a general rule, increases his assessment on Estates watered from Canals, by reason of the increased assets which the command of Canal water insures, and the proportion of increase may be taken on the average, at about 25 per cent of the Government Demand. Now, I believe, it will be found to simplify matters exceedingly, if the identification of Land Revenue and Irrigation Demands, now made in a partial, be made hereafter in a perfect manner; and that for a mixed levy, part collected by the Collector, and part by the Canal Officer, there be substituted a single levy, collected exclusively by the Collector, but carefully discriminated in Record and Account, and credited duly to the Land Revenue and Irrigation Departments, in its proper proportions. Assuming the now separate Departments to have been subordinated, as proposed, to a common Head, and to have a common Central Office of record and account, there will, I conceive, be no practical difficulties in giving to this proposal a satisfactory working form.

159. The first step towards this result, which ought to be taken, is the formation of an Irrigation Survey and Settlement Establishment, having

* See "Report on the Revenue Returns of the Canals under the Superintendent General of Irrigation, North-Western Provinces, for the year 1859-60," p. 22. This is no place to discuss a purely technical question, but I may say that the facts shown in this Report, interesting and valuable in themselves, have, in my opinion, been either misinterpreted altogether, or only half understood. They confirm strongly the soundness of the general principles advocated in the Text.

objects in reference to rights in water, similar to those which the Revenue Survey and Settlement Establishment had in regard to rights in land, in so far as the differing objects allow of similarity. As the Land Settlement rests on the careful and discriminating determination, by highly qualified Agents, of the Productiveness of the land under all its varying conditions, so would the Irrigation Settlement rest on the like careful and discriminating investigation of the Irrigability of the land under all its varying conditions. The true value of Irrigation, as influenced by differences of level, of soil, of supply, and so on, would thus be determined by close and careful enquiry on the spot, and rates of Water Revenue, checked and guarded with as much care as those of Land Revenue, would be obtained and applied in fixing at a light and equitable total, the Demand of Government for water.

160. The Land Revenue Survey has already supplied, in its professional Maps of Estates, an invaluable help to the Irrigation Survey. These maps, supplemented by the exhibition upon them of the necessary levels, would form a perfect record of the Irrigability of Estates in so far as geodetical conditions were concerned. Separate records, corresponding *mutatis mutandis* to those of the Land Revenue Settlement, would secure the due recognition of all other conditions affecting rights or customs connected with the use of the water. The Irrigation Settlement Department should carry on its work under the direction of the Revenue Board. The immediate control would naturally be exercised by the Irrigation Member; but being in constant communication with his experienced Colleagues, the bearing on the Land Revenue of every step taken, could be promptly discussed, difficulties adjusted, and appropriate directions given, so as to insure harmony in the results of the work.

161. By the operations of the Irrigation Settlement Establishment so directed, and regulated, I am confident that such an amount of detailed, accurate, and trustworthy information would be brought clearly into view, as entirely to dispel the existing obscurity, to reduce present confusion to order, and to make the Permanent or Perpetual Settlement of the Water Revenue a problem of easy solution. Our primary want is now, just as it was prior to the introduction of Act VII of 1833, the want of knowledge; and till that want is supplied, our course must always be hesitating, and is very likely, in many cases, to be altogether wrong. The Settlement Survey suggested is the best means I can think of for the removal of this obstruction, and for placing the whole Irrigation System on a secure and acceptable foundation.

162. The amount of work to be done as above defined is not very great, nor need it take very long. An energetic and qualified Chief Settlement Officer, with a staff of young and active European Assistants, chosen by himself, and aided by some of the most intelligent of the Native Deputies or Agents of the Irrigation Department, would probably have settled the Eastern Jumna and Ganges Canal Districts in two, or at most three working seasons.

163. It would be expedient to commence work on one Canal, and many conditions combine, to make the Eastern Jumna Canal incomparably the most

instructive field in which to begin. It has been brought to the highest degree of development in reference to its Irrigating capabilities. It has been in active operation during two periods of extreme Drought, and has thus been most fully tested. The region it waters supplies every variety of soil, of cultivating races, of levels, &c., by which the development of Irrigation could be influenced, and the results of an experience of thirty years of constant work are available for aid and guidance in the records of its Office. It is of very manageable extent, and such a Settlement Survey of it, as is here contemplated, would bring out not only the separate facts, but also the governing laws, of the growth of Irrigation in such a way as to be readily applicable to other Canals, which, like the Ganges Canal, are only as yet in the earlier stages of their development.

164. It is generally believed, though as yet on no very satisfactory evidence, that Estates on a Canal arrived at its highest stage of development can safely and equitably be taxed about 25 per cent in excess of the general rate, *irrespective of Water-rent.* It would probably be found that, *including Water-rent,* the enhancement would rise to an average ranging somewhere between 40 and 50 per cent. This extra Cess on Canal Districts would be found to protect most amply the interests of Government under a Perpetual Settlement. The precise way in which the increase could be best imposed, is one of those questions of detail on which the results of the Settlement Survey would throw all needful light, and it would be premature to attempt to define it now. But, that it may be so imposed as to fall very lightly on land enjoying the security, and other advantages of Canal Irrigation, seems unquestionable. Its falling, too, as a special Cess on such Estates, in consideration of their Proprietors having had no direct concern in creating the special advantages they enjoy, will relieve the Perpetual Settlement from the objection of producing inequality of Taxation in favor of Irrigated Districts, to which Revenue Officers attach serious importance. But when once the amount of this special Cess had been defined, and the manner of its imposition determined, no lingering regrets over supposed farther sacrifices, should be allowed to prevent its fixture for ever.

165. To Canal Estates thus settled with, would be secured on the payment of the amounts fixed for each, the enjoyment of quantities of water proportioned to their wants, as ascertained by the Irrigation Settlement Officer. These volumes would be delivered by measure through regulated outlets, the construction of which, under the supervision of the Settlement Department, would precede the final closure of the operations. It is desirable that the work should not be embarrassed by needless scrupulosity about the exactitude of measuring apparatus. There are probably in all Northern Italy no two outlets of the same nominal value that correspond with rigid accuracy in their actual discharges. But the limits of error are practicably unimportant, and are never allowed for a moment to impair the action of the principle of fixed issue at fixed rates. It should be the same with us, and if care be taken to throw the inclination to error, rather on the side of the Consumers of the water than against them, the practical results

will, I venture to say, be found perfectly unimpeachable. Due provision should be made in the rates for Ordinary fluctuations of supply, and fair conditions of compensation for Extraordinary fluctuations; but it is evidently desirable that the general pressure should be so moderate, that demands for compensation may justly be restricted to very rare occasions.

166. I hold the principle of fixity of demand to be universally applicable to Irrigation Revenue Settlements. It only requires modifications of form, to adapt it either to Irrigation by natural flow of the water, or Irrigation by the use of machinery. As the Eastern Jumna Canal supplies examples of both forms in abundance, I feel reasonably confident that, the Settlement Department will on its survey being completed, find themselves quite competent to indicate the means of settling the Demand on each for a term, or for ever. They will also be able to determine fair standard values for the redemption of the annual payments for the Water, and thus to place the water supplies of Northern India, in circumstances, as favorable to the growth and strength of the Community, as are those of Northern Italy.

167. Summarily, therefore, as regards the general dealing with the Revenue of the Famine Tracts, whether derived from Land Tax or Water Rate, I am of opinion that it would be safe, prudent, and profitable to the State;

1*st.*—To declare the Public Demand for the former Perpetual in all Districts, or Sections of Districts, unaffected by works of Irrigation executed at the Public cost exclusively, where prolonged Settlements have previously existed, and where there is reason to be confident that these Settlements are fair and equitable.

2*nd.*—To institute revisions in Districts or Sections of Districts where there is cause to suspect the equity of existing Settlements, with a view to the fixture of the Demand on the land in perpetuity in them also, with the least practicable delay.

And finally, to except such Sections of Districts as are under the direct influence of Government Canals from Perpetual Settlement of the Land Revenue, for such time only, as may be indispensably necessary to the completion and reasonable test of that Irrigation Survey and Settlement, which has just been described and recommended, when the Water Rate should also be fixed in Perpetuity.

168. If I have succeeded in conveying to Government even inadequately, the deep sense I have been led to entertain of the strengthening influences of these measures on Native Society, viewed from that special point of view whence it has been my duty during this enquiry to regard them, I think the general conclusion arrived at, that their effects, if permitted to develope themselves during another such interval as elapsed between the Famine periods of 1837-38 and 1860-61, will be such as to reduce Drought, even of the highest intensity we have yet experienced, from the status of a cruel and destructive calamity, to that of a temporary and bearable misfortune, will not be considered exaggerated or unreasonable. I am not so sanguine as to suppose that we can completely obviate the effects of such unnatural seasons. There are, and in every Community always

must be, classes who will suffer at such times; but we may confidently hope that as Society grows in self-sustaining power and resource, even the suffering of these classes will not be then as heretofore and now, sufferings unto death.

169. In carrying the modifications of the Irrigation System above suggested into practical effect, I make sure of the hearty appreciation of the local Community in general, since in passing through the Canal Districts I found that the earnest and uniform demand of all classes, District Officers, Landholders, European and Native, small Proprietors and Cultivators, was for relief from the incessant and harassing interference of corrupt Native establishments, from the frequent fluctuations of Demand to which they had been subjected, and from the evils generally inherent in a system of half-yearly adjustments of the Government charges for the water supplied to them. Measures directed to these objects, based on the sound principles, and applied in the equitable spirit now contemplated; would, I have no doubt, be regarded by the Agricultural community as a boon only second in value to the Perpetual Settlement of the Land Tax.

170. It now only remains for me to close this Report with a few remarks on the last of the three main subjects to which I have limited my enquiries, viz., the System of internal Communications as connected with Famines. The influence of this system on Famines caused primarily, not by want of food, but by want of labor, for those classes solely dependant on labor as their means of procuring food; is by no means so direct, as that of the two series of measures previously discussed. But its action is still so important as to make its farther extension certainly one of the main means of protecting the Community against the bad effects of periods of Drought. The pouring in of additional supplies of grain, on a scale large enough to keep prices moderate at such periods, would make all available resources go so much farther than they now do, that Society could bear its burden with diminished effort. In combination indeed with the measures previously recommended, whereby at least some fair field of labor would, even in the worst seasons, be secured for the suffering classes, the cheapness of food due to effective Communications would become of the highest value. The comparatively local character of Droughts, and their effects, insure the area of supply being usually much larger than the area of suffering. The perfectly free and unchecked circulation of the abundant produce of the one, through the markets of the other, would put an end to those startling anomalies of Price which the last Famine has made familiar to us.

171. In 1860-61 the total importations of food-grains amounted to nearly 5 millions of maunds. Between 40 and 50 millions is the quantity required to subsist the entire population of the Famine Tract for the time between two harvests. The importation of between one-eighth and one-tenth of the total quantity required, brought prices down about 37 per cent below their maximum. The importation of about three-eighths of the total quantity required would, therefore, on the same data, have lowered them to somewhat less than half the maximum, making the market rate about 17 seers per Rupee, which, though high, is still not immoderately so; and it certainly is most improbable if we do justice

to our Communications, that we shall ever again have a maximum of 7½ or 8 seers per Rupee to deal with. Of course the influence of importation would be so much the more marked, the less this maximum might be. There is nothing extravagant in supposing that 15 or 20 millions of maunds of food-grains may, when the system of Communications is perfected, be thrown into any part of the Region under consideration between the two Harvests. Unprepared, ill-equipped, and incomplete as that System was in 1860-61, it was yet adequate to the circulaiton of 5 millions in the time mentioned; and it is unlikely that to triple or quadruple this amount will surpass local capacity. Such a result would eliminate Famine Prices of Food from among the aggravations of our periods of Drought.

172. From this point of view, there is certainly no part of the general system of communications so important as the Railways. Fully a third of the whole importations of 1860-61 were carried by the East Indian Railway only, under many and serious disadvantages. The ability to draw on the almost inexhaustible resources of the Nerbudda Territories, which the opening of the Jubbulpore Line will hereafter supply; the command of such regions as are traversed by the Gogra, the Goomtee, and the Raptee, including all Oude and Gorruckpore, which a central line through the former Province would insure; the linking of this line through Rohilkund with the East Indian Railway, would give a free outlet to the surplus produce of the fertile districts of that rich Province; and with natural granaries so extensive in their areas, and so varied in their physical conditions, thus intimately bound together by a chain of easy inter-communication, pressure in any one part would instantly be lightened by the flow of produce from another, and the general strength be much increased. I need scarcely say, therefore, how earnestly I desire to see the Railway system completed, as one of the most effective of the guarantees against the evil effects of future Droughts, which we have it in our power to provide.

173. It is scarcely to be expected that our existing Canals of Irrigation will ever be very perfect channels of Communication. But that they may be made of considerable use has been clearly enough shown, by the extraordinary increase of traffic on the Ganges Canal during the Famine period. The number of Boats increased from less than 200, to about 1,000 between January and June 1861, and they were then still below the demand. Even when the Railway is opened, the Canal will be valued as a special outlet for the produce of the Canal Districts, and its usefulness will scarcely be affected. But I cannot conceal my belief that, when Irrigation has reached its full development, it is scarcely possible that, during a period of severe Drought, any practicable Police arrangements will suffice to insure a supply of water reaching the terminus of the Canal either on the Ganges, or on the Jumna. In ordinary years this risk would be easily obviated, but in Famine years I think it would be real and serious. Irrespective, therefore, of other difficulties inherent in the attempt to combine in such Canals as those of the North-Western Provinces and Punjab, the two objects of Irrigation and Navigation, each

having special requirements scarcely compatible with those of the other, there will always be this grave danger, that they will fail just at the crisis when their aid is most imperatively wanted. Hence, I believe, it would be expedient to provide independently for Irrigation and Navigation, by a separate navigable channel designed specially for the latter. If the slopes of the Irrigation Channels be decreased sufficiently to meet the wants of Navigation, such an expense must be incurred as would go far towards making an independent Canal of navigation. It is expressly provided on sanitary considerations, that Canals of Irrigation shall be kept at long distances from all large towns. A navigable Canal that avoids great commercial Marts, is I need scarcely say a very imperfect piece of commercial machinery, and I certainly would deprecate any serious outlay in attempts to fit the existing channels of the Ganges Canal to purposes of Navigation, beyond the standard originally designed. I believe that modifications of five or six Bridges towards the lower end of the Canal might with advantage be made; Docks for stowage of boats both at Cawnpore and Roorkee; Sheds for goods at different landing places; landing Platforms, Cranes, and all the minor aid required by Traders for security and convenience might, with propriety, be supplied. The vast water-power, too, which the Falls of the Canal make available, might be turned to some account for working Cotton Screws, or other machines useful in reducing the staple exports of the Canal Districts to the smallest possible bulk; and such use once shown, would, in all probability, soon tempt private enterprise into the same field. In the hope that it may be useful in indicating the still unused resources of the Canal in these ways, I place in the Appendix a memorandum on the subject, from which it will be seen that somewhere about 40,000 Horse-power waits employment. Beyond the moderate expenditure required for such objects as the above, however, I do not think it would be expedient to spend money on the existing Channels. It will form a proper subject of consideration and enquiry, as to how far it might be expedient to attach to the Ganges Canal a separate line, adapted specially for navigation. This, however, is not a question to be disposed of, or even fairly judged of, without preliminary enquiry; and I therefore refrain from making any other recommendation in reference to it, than to commend it to notice as deserving examination. I have much doubt of the capacity of even the East Indian Railway, supplied with a double way, and re-enforced by the possible loop Line from Benares through Oude and Rohilkund similarly perfected, to carry the vast traffic of the Gangetic Valley; and I am sure that, even when such means of transit are fully employed with remunerative returns, there will yet remain a great mass of produce for which cheap water carriage will be a necessity.

174. The experience of the Famine period of 1860-61 has tended to impair confidence in the capacity of the Grand Trunk Road to stand any great concentration of traffic. Nothing could exceed its total disorganization between Cawnpore, Futteghur, and Allighur, when I had opportunities of seeing it in the

Spring. It was worse than an ordinary earthen Road. It is difficult to say what amount of traffic in excess of the average quantity, passed over the main Trunk to Allighur, and the Branch to Futteghur, between January and June 1861. But as the increase was due to the grain Trade alone, and the upward flow was divided between the Ganges Canal and the Trunk Road, I think it would not be far wrong to assume, that about one million of maunds passed to Allighur along the Road, the greater share being concentrated in the months of January, February and March. It has been very clearly shown by Mr. H. B. Riddell, Director General of Post Offices in India,* from the experience of the Bullock Train, that the rate of transport per Ton per mile, on a good metalled road is Rupees 0-1-0½, while the rate on an unmetalled road, is Rupees 0-3-1½. By ordinary Native carts, and over common District Roads, the latter rate is naturally rather less, than that for the Government Bullock Train, being nearly Rupees 0-2-0 per Ton per mile. At such rate it will be found that the costs of transport of one million of maunds from Cawnpore to Allighur, were enhanced by the bad condition of the Grand Trunk Road, by rather more than four Lakhs of Rupees, or £40,000. It would, therefore, have been economical to have spent Rupees 2,000 per mile on this Road, to have insured the traffic passing over it with only the ordinary amount of obstruction. It may be hoped, however, that so excessive a strain will not be thrown upon it again, as within a short time the Railway will come to its relief in addition to the Canal. The metalled track is, however, very narrow for a great central line of Trade, and might, with advantage and economy, be nearly doubled in width. It was quite evident, from seeing the manner in which during the time the greatest pressure continued, the mass of carts on the Road impeded each other, that a greater width would have lightened the wear and tear very much, and might possibly have saved the metal from entire ruin.

155. The steady extension of metalled Roads, so as to connect each of the chief Provincial marts with the Railway system, is a point which will naturally receive the attention of the Local Authorities. The Famine has itself done much for the country in this way, as having led to the rapid construction of some valuable communications bridged and metalled, and, no doubt, certain assignments of funds will continue to be made year by year for their extension. It would be well, however, that the general plan for such extensions should receive very careful consideration, and should be worked upon systematically. The energy of individuals, not always unexceptionally directed, or mere local influences, are often much more operative in determining extensions of the kind, than regard for the interests of Commerce, or attention to the direction of the currents of Trade in the locality. The cost of maintaining a large system of metalled Roads will, no doubt, always be a somewhat serious difficulty. Though strongly opposed to the Turnpike system in the North-Western Provinces and Punjab, my opposition was not at all to the equitable principle of

* Selections from the Records of the Government, North-Western Provinces, Volume II., Page 141.

making Trade bear its fair share of the costs of maintaining special facilities for its convenience, but to the unworkable way in which it was tried to carry the principle into practice. A system of Registration of carts employed in transport of goods and the levy of moderate fees, payment of which would make the Proprietors free of all Imperial Roads, might be found a more profitable and practicable expedient. If such fees were so regulated as to compensate, not for Tolls only, but also for Ferries, and the bearers of Registered Tickets left to circulate how and where they chose, without farther let or hindrance than the production when required of their Tickets, the probability is, that no small amount of irregular obstruction to Trade would be removed. There may be other expedients preferable to this; but until one can be applied, falling lightly on individuals, but profitable in the aggregate, the burden of sustaining this part of the system of communications will always be likely to provoke discontent.

156. The last element in the System, the connection of the interiors of Districts, now in so many cases quite isolated, through means of village roads, with the general communications of the country, is deserving of much careful consideration. The want of such connection was sufficiently shewn during the Famine, by those remarkable variations in prices within inconsiderable limits of distance before alluded to; and the full benefit to the Community at large of the surplus produce of Districts of supply, however fertile, can never be secured until these local channels are freely opened up. The existing organization for their construction is not free from objections. The pecuniary resources available are so small, that professional intelligence cannot be paid for. Work under Local Road and Ferry Fund Committees is carried on accordingly without much system, and occasionally with unsatisfactory results. In 1856, at the request of the late Lieutenant-Governor, Mr. Colvin I compiled a General Map of District Roads in the North-Western Provinces The Map itself was lost with other records at Agra in 1857; but I have a clear recollection of the extraordinary anomalies it brought to light in reference to the operations of the Local Committees. Working quite independently of each other, they seemed to have carried roads to the boundaries of their own Districts, and left them there, the lines sometimes missing junction by about a mile or so, evidently the results of want of concert in the Committees, and want of capacity or will on the part of their respective agents to carry out combined operations. A step in the right direction towards the correction of blunders like these, has very recently, I observe, been made by the establishment of a Civil Engineers' Department for the special purpose of assisting the Road Fund Committees. If the gentlemen of this new Department will give their attention to the wants of Trade and Agriculture in their respective Divisions, and so project their works as to meet those wants intelligently, and in concert with each other, much good may result from their appointments. But the field is very large, and the workmen are very few. A single Divisional Engineer has a charge about the size of a third rate European Kingdom, and it would be unreasonable to expect him to be able to

impress much of unity, on the works he must direct over so unmanageable an area. The available means, too, are very small; so small that, unless they can be increased, the extent of work done must be far beneath the necessities of the case. But there will still be some good done even with the limited resources available, and the step now taken may be accepted as an augury of larger progress in the same direction hereafter. I believe that a searching analysis of the manner in which Road and Ferry Funds are expended —the proportions spent on Station and District Roads respectively—on repairs and maintenance—on establishments, and like points illustrating the actual working of the system, would be very useful. I am under the impression that existing resources are barely adequate to the maintenance of existing Roads, imperfect though these are. I speak from the recollection of Estimates made by myself some years ago, and therefore under correction. But I am confident that, if adequate for maintenance, they are quite inadequate for extension to any thing like the degree required. If the interiors of Districts are to be freely connected with the great Trade outlets and inlets supplied by the Railways, the Rivers, the Canals, the metalled Trunk and Branch Roads, liberal help will have to be extended to the means now available, and the Region under consideration will not be fully endowed with subordinate channels for the circulation of its Produce, under a smaller ultimate outlay than about half a million sterling. When the entire system, however, has been brought into perfect co-operation dearth of food will cease to be among the possibilities of a period of Drought, and it is not likely to be thought an over-sanguine anticipation, to expect that, given another such interval of time as has passed between the two Famine periods under discussion, the co-operation required, will have been effected in all the completeness needful to the end in view.

157. I have now finished this final Section of my Report, and if I do not dwell on other strengthening influences than those to be drawn from the extension of sound Fiscal principles, from the improvement of our Irrigation system, and from the completion of the means of free circulation of Trade through extended Communications, it is not because I undervalue these separate causes of growth and progress, but because they lie beyond my ability to deal with. There are many fruits of powerful and enlightened Government other than those referred to, which act, each in its degree, as antidotes to the noxious consequences of any calamities weakening in their influence on the Community. But to analyse and exhibit the details of such action, need experience I do not possess, and information I have had no opportunities of collecting. I am sensible, therefore, that there are still aspects of the question undisplayed and unillustrated, inasmuch as it embraces within its broad limits as I have before had occasion to say, all the varied agencies that work towards the gradual regeneration and consolidation of Native society. But I trust that those principles which I have endeavoured to recommend to favorable consi-

deration in this Section, though they may not cover the whole subject, will still be accepted as sound in themselves; safe in their application; and fruitful in their promise of future strength and vigour, to resist such depressing evils as flow from our experience of the Droughts and Famines of Northern India.

158. I have only further to express my grateful sense of the ready and cordial assistance given to me, in the preparation of this Section of my Report, by the Sudder Board of Revenue, North-Western Provinces and the Superintendent General of Irrigation. The records of the former office have apparently suffered much; but in both cases, whatever seemed likely to be of use, has been supplied with a ready courtesy and completeness which I have to acknowledge heartily.

I have the honor to be,

SIR,

Your most obedient servant,

CALCUTTA,
*The 14th August*, 1861.

(Signed) R. BAIRD SMITH, *Colonel,*
*On Special Duty.*

# APPENDIX I.

## Some Price Lists of Food-Grains, useful for References.

I.—*Table showing the market price of Grain, &c., in Lower Bengal from the year* 1700 *to* 1813, *extracted from authentic documents of one month in each year for which generally the month of August was selected. Drawn up by* G. Herklotts, Esq., *Fiscal of Chinsurah. Continued to* 1861.*

| Year. | Rice, best sort. | Rice, course. | Inferior Grains. | Dâl (Pulse). | Gram (Vetch). | Wheat. | Ghee (clarified Butter). | Mustard Oil. | Cowries (Shells used as Coin). |
|---|---|---|---|---|---|---|---|---|---|
| 1700 ... | 40 | 70 | 60 | 60 | 70 | 30 | 10 | 4 | 32 |
| 1701 ... | 30 | 40 | 60 | 50 | 50 | 30 | 8½ | 3¼ | 32 |
| 1702 ... | 40 | 60 | 70 | 50 | 70 | 50 | 7 | 3 | 32 |
| 1703 ... | 40 | 60 | 80 | 60 | 60 | 50 | 13 | 5½ | 32 |
| 1706 ... | 60 | 90 | 80 | 80 | 80 | 80 | 6 | 2¾ | 34 |
| 1714 ... | 80 | 120 | 120 | 80 | 130 | 90 | 5¼ | 3½ | 32 |
| 1715 ... | 40 | 50 | 50 | 40 | 70 | 45 | 6½ | 2½ | 32 |
| 1716 ... | 45 | 55 | 60 | 45 | 70 | 45 | 8 | 2½ | 32 |
| 1717 .. | 40 | 50 | 40 | 40 | 50 | 45 | 7¾ | 4¼ | 32 |
| 1718 ... | 35 | 40 | 35 | 35 | 45 | 35 | 8¾ | 6 | 32 |
| 1719 ... | 32 | 38 | 35 | 30 | 40 | 22 | 8½ | 4½ | 32 |
| 1720 ... | 40 | 45 | 40 | 32 | 40 | 30 | 8 | 3¾ | 32 |
| 1721 ... | 40 | 45 | 40 | 30 | 40 | 25 | 8½ | 3¾ | 32 |
| 1722 ... | 30 | 35 | 37 | 30 | 40 | 25 | 8¾ | 3½ | 32 |
| 1723 ... | 32 | 35 | 40 | 30 | 50 | 25 | 8¾ | 3 | 32 |
| 1724 ... | 32 | 40 | 45 | 32½ | 55 | 27½ | 8¾ | 3 | 32 |
| 1726 .. | 40 | 45 | 50 | 30 | 50 | 22 | 9 | 6½ | 32 |
| 1728 ... | 22 | 30 | 28 | 30 | 30 | 18 | 8½ | 6½ | 32 |
| 1729 ... | 30 | 40 | 35 | 40 | 40 | 20 | 8 | 6½ | 32 |
| 1732 ... | 20 | 35 | 30 | 35 | 45 | 30 | 10 | 6 | 32 |
| 1733 ... | 20 | 35 | 30 | 35 | 45 | 30 | | | |
| 1734 .. | 25 | 30 | 25 | 30 | 30 | 20 | 10½ | 6¼ | 32 |
| 1735 ... | 25 | 30 | 25 | 30 | 30 | 20 | 10½ | 6½ | 32 |
| 1736 ... | 24 | 30 | 24 | 30 | 30 | 20 | 10 | 5 | 32 |
| 1739 ... | 24 | 30 | 24 | 25 | 28 | 20 | 10¾ | 4¾ | 32 |
| 1740 ... | 25 | 32 | 25 | 24 | 30 | 22 | 10¾ | 4¾ | 32 |
| 1741 .. | 24 | 31 | 23 | 25 | 27 | 26 | 10½ | 4½ | 34 |
| 1742 ... | 20 | 25 | 18 | 20 | 24 | 20 | 11½ | 4¾ | 33 |
| 1744 ... | 13 | 16 | 15 | 14 | 16 | 14 | 16¼ | 6½ | 36 |
| 1745 ... | 14 | 17 | 16 | 16 | 20 | 15 | 15 | 8½ | 32 |
| 1746 ... | 28 | 34 | 36 | 40 | 43 | 22 | 14 | 5 | 32 |
| 1747 ... | 18 | 22 | 22 | 32 | 40 | 25 | 10¾ | 5¾ | 32 |
| 1748 ... | 26 | 32 | 27 | 34 | 40 | 35 | 12 | 4¼ | 32 |
| 1750 ... | 40 | 50 | 35 | 45 | 65 | 28 | 15 | 4¾ | 32 |
| 1751 ... | 30 | 38 | 39 | 47 | 70 | 40 | 16½ | 9½ | 32 |
| 1752 ... | 10 | 11 | 17 | 27 | 20 | 14 | 15 | 8 | 32 |
| 1753 ... | 18 | 21 | 13 | 22 | 25 | 20 | 15¾ | 9 | 32 |

* The first six articles give the number of Seers per Rupee; the Ghee and Mustard Oil, the price per Maund in Rupees; and the Cowries, the number of *Puns* per Rupee. The *Pun* is equal to one Pice or to 80 Cowries.

*Table I,—continued.*

| Year. | Rice, best sort. | Rice, coarse. | Inferior Grains. | Dâl (Pulse). | Gram (Vetch). | Wheat. | Ghee (clarified Butter). | Mustard Oil. | Cowries (Shells used as Coin). |
|---|---|---|---|---|---|---|---|---|---|
| 1754 ... | 22 | 32 | 22 | 22 | 23 | 16 | 14 | 5½ | 32 |
| 1755 ... | 21 | 33 | 18 | 24 | 30 | 19 | 15½ | 7½ | 32 |
| 1756 ... | 23 | 40 | 32 | 42 | 59 | 34 | 15 | 4¾ | 32 |
| 1757 ... | 30 | 42 | 46 | 35 | 42 | 18 | 14¼ | 7½ | 32 |
| 1758 ... | 30 | 37 | 30 | 32 | 28 | 23 | 17½ | 7½ | 32 |
| 1759 ... | 28 | 31 | 21½ | 16½ | 32½ | 24 | 17½ | 7½ | 32 |
| 1762 ... | 26 | 28 | 38 | 35 | 35 | 58 | 14¼ | 5¾ | 32 |
| 1763 ... | 28 | 25 | 28 | 40 | 30 | 20 | 14 | 6 | 32 |
| 1764 ... | 26 | 31 | 27½ | 28 | 32 | 26 | 18½ | 9½ | 32 |
| 1766 ... | 14 | 24 | 18½ | 18 | 28½ | 16 | 22½ | 10 | 32 |
| 1769 ... | 10 | 11 | 14 | 13 | 15 | 13 | 26 | 12½ | 32 |
| 1770 ... | 3 | 3¼ | 4½ | 4 | 15¼ | 4¼ | 20 | 14 | 32 |
| 1771 ... | 19 | 24 | 17 | 15 | 18 | 17 | | | |
| 1772 ... | 23 | 34 | 29 | 29 | 35 | 32 | | | |
| 1773 ... | 29 | 31 | 44 | 42 | 50 | 51 | 17½ | 3 | 32 |
| 1774 ... | 28 | 32 | 35 | 40 | 55 | 45 | 16½ | 6¼ | 32 |
| 1775 ... | 23 | 27 | 30 | 36 | 57 | 36 | 15½ | 5½ | 32 |
| 1776 ... | 24 | 30 | 37 | 36 | 42 | 40 | 12½ | 5½ | 32 |
| 1779 ... | 17½ | 25 | 20 | 14¼ | 42 | 40 | 12½ | 5½ | 32 |
| 1780 ... | 20 | 30 | 25 | 17 | 45 | 22 | 19 | 10½ | 32 |
| 1781 ... | 26 | 38 | 30 | 32 | 55 | 28 | 19 | 9 | 32 |
| 1786 ... | 24 | 25 | 28 | 36 | 44 | 24 | 18 | 13½ | 67 |
| 1787 ... | 22 | 25½ | 34 | 27 | 40 | 30 | 18 | 12 | 66 |
| 1788 ... | 12 | 14 | 16 | 23 | 30 | 19 | 16½ | 12½ | 74 |
| 1789 ... | 17 | 24 | 25 | 27 | 50 | 24 | 17½ | 12 | 72 |
| 1790 ... | 18 | 24 | 24 | 40 | 90 | 25 | 17½ | 12½ | 68 |
| 1791 ... | 16 | 20 | 20 | 30 | 48 | 22 | | | |
| 1792 ... | 17 | 24 | 29 | 25 | 36 | 26 | | | |
| 1793 ... | 17 | 29 | 32 | 29 | 48 | 22 | | | |
| 1794 ... | 26 | 37 | 42 | 54 | 82 | 45 | | | |
| 1802 ... | 35 | 38 | 38 | | 58 | 33 | | | |
| 1803 ... | 34½ | 40 | 53 | | 40 | 44 | | | |
| 1804 ... | 32 | 42 | 53 | | 40 | 40 | | | |
| 1805 ... | 40 | 50 | 35 | | 32 | 40 | | | |
| 1806 ... | 35 | 40 | 42 | | 49 | 53 | | | |
| 1807 ... | 22½ | 26½ | 45 | | 49 | 38 | | | |
| 1808 ... | 33 | 40 | 42 | | 39 | 32 | | | |
| 1809 ... | 32 | 35 | 33 | | 32 | 34 | | | |
| 1810 ... | 26½ | 32 | 34 | | 29 | 26½ | | | |
| 1811 ... | 28 | 30 | 22 | | 34 | 24½ | | | |
| 1812 ... | 34 | 45 | 33 | | 58 | 45 | | | |
| 1813 ... | 34 | 40 | 35 | | 32 | 34 | | | |
| 1814 ... | 32 | 49 | 80 | 25–8 | 40 | | | | |
| 1815 ... | 33–10 | 47–10 | 75–3 | 65–2 | 33–10 | | | | |
| 1816 ... | 29 | 45–12 | 53–5 | 21–5 | 53–5 | | | | |
| 1817 ... | 25–8 | 30–4 | 53 | 24–11 | 35–8 | | | | |
| 1818 ... | 27 | 37–12 | 49–8 | 13–5 | 32 | | | | |
| 1819 ... | 23–8 | 33–8 | 45–8 | 10 | 20 | | | | |
| 1820 ... | 24–8 | 32 | 45–8 | 20 | 27 | | | | |
| 1821 ... | 21–4 | 37–8 | 45–8 | 22–12 | 29 | | | | |
| 1822 ... | 22–12 | 40 | 58 | 24–8 | 25–8 | | | | |
| 1823 ... | 26–2 | 35–8 | 49 | 18 | 32 | | | | |

*Table I,—concluded.*

| Year. | Rice, best sort. | Rice, coarse. | Inferior Grains. | Dâl (Pulse) | Gram (Vetch). | Wheat. | Ghee (clarified Butter). | Mustard Oil. | Cowries (Shells used as Coin). |
|---|---|---|---|---|---|---|---|---|---|
| 1824 ... | 17–14 | 21–4 | 40 | 13–4 | 23–8 | | | | |
| 1825 ... | 24–8 | 29 | 64 | 17 | 33 | | | | |
| 1826 ... | 24–9 | 29 | 42–10 | 16–13 | 30–7 | | | | |
| 1827 ... | 26–10½ | 32 | 53–4 | 14–14 | 33–10 | | | | |
| 1828 ... | | | | | | | | | |
| 1829 ... | | | | | | | | | |
| 1830 ... | | | | | | | | | |
| 1831 ... | | | | | | | | | |
| 1832 ... | | | | | | | | | |
| 1833 ... | | | | | | | | | |
| 1834 ... | | | | | | | | | |
| 1835 ... | | | | | | | | | |
| 1836 ... | | | | | | | | | |
| 1837 ... | | | | | | | | | |
| 1838 ... | | | | | | | | | |
| 1839 ... | | | | | | | | | |
| 1840 ... | | | | | | | | | |
| 1841 ... | | | | | | | | | |
| 1842 ... | | | | | | | | | |
| 1843 ... | | | | | | | | | |
| 1844 ... | | | | | | | | | |
| 1845 ... | | | | | | | | | |
| 1846 ... | | | | | | | | | |
| 1847 ... | | | | | | | | | |
| 1848 ... | | | | | | | | | |
| 1849 ... | | | | | | | | | |
| 1850 ... | | | | | | | | | |
| 1851 ... | | | | | | | | | |
| 1852 ... | | | | | | | | | |
| 1853 ... | 29–8 | .. | 64 | 32 | 22–13½ | 24–10 | 2 | 4–8 | |
| 1854 ... | 26 | 29 | .. | 32 | 25 | 20 | 2 | 4–8 | |
| 1855 ... | 32 | 35 | 50 | 32 | 32 | 25 | 2 | 5 | |
| 1856 ... | 26–8 | 32 | 55 | 28 | 25 | 28 | 1–12 | 3–12 | |
| 1857 ... | 20 | 22–8 | 50 | 21 | 13 | 13–5 | 1 | 3–3 | |
| 1858 ... | 12 | 14 | 23 | 18 | 21 | ... | 1–4 | 4 | |
| 1859 ... | 8–14 | 13–5 | 18–12 | 17–12 | 24 | 16 | 1–13 | 4 | |
| 1860 ... | | | | | | | | | |
| 1861 ... | | | | | | | | | |

II.—*Table showing the average market price of Food-Grains, &c., at Allyghur, North-Western Provinces, from* 1804 *to* 1861, *from various Records.**

| Year. | Wheat. | Barley. | Inferior Grains. | Gram, 1st sort. | Gram, 2nd sort. | Rice. | Oil. | Ghee. | Sugar. | Dál. |
|---|---|---|---|---|---|---|---|---|---|---|
| | M. S. C. | M. S. C. | M. S. C. | M. S. C. | M. S. C. | M. S. C. | M. S. C. | M. S. C. | M. S. C. | M. S. C. |
| 1804 | 0 19 12 | ... | ... | 0 23 8 | ... | ... | ... | ... | ... | ... |
| 1805 | 0 25 10 | ... | ... | 0 27 8 | ... | ... | ... | ... | ... | ... |
| 1806 | 0 35 2 | ... | ... | 0 50 8 | ... | ... | ... | ... | ... | ... |
| 1807 | 0 35 0 | ... | ... | 0 56 2 | ... | ... | ... | ... | ... | ... |
| 1808 | 0 28 8 | ... | ... | 0 35 0 | ... | ... | ... | ... | ... | ... |
| 1809 | 0 23 0½ | ... | ... | 0 29 12 | ... | ... | ... | ... | ... | ... |
| 1810 | 0 33 0 | ... | ... | 0 38 12 | ... | ... | ... | ... | ... | ... |
| 1811 | 0 51 8 | ... | ... | 0 67 12 | ... | ... | ... | ... | ... | ... |
| 1812 | 0 35 8 | ... | ... | 0 49 8 | ... | ... | ... | ... | ... | ... |
| 1813 | 0 23 8 | ... | ... | 0 23 12 | ... | ... | ... | ... | ... | ... |
| 1814 | 0 35 0 | ... | ... | 0 38 8 | ... | ... | ... | ... | ... | ... |
| 1815 | 0 47 14 | ... | ... | 0 49 8 | ... | ... | ... | ... | ... | ... |
| 1816 | 0 41 14 | ... | ... | 0 31 14 | ... | ... | ... | ... | ... | ... |
| 1817 | 0 29 12 | ... | ... | 0 31 5 | ... | ... | ... | ... | ... | ... |
| 1818 | 0 20 6 | ... | ... | 0 20 12 | ... | ... | ... | ... | ... | ... |
| 1819 | 0 19 12 | ... | ... | 0 20 4 | ... | ... | ... | ... | ... | ... |
| 1820 | 0 19 8 | ... | ... | 0 20 6 | ... | ... | ... | ... | ... | ... |
| 1821 | 0 29 4 | ... | ... | 0 29 0 | ... | ... | ... | ... | ... | ... |
| 1822 | 0 33 4 | ... | ... | 0 35 4 | ... | ... | ... | ... | ... | ... |
| 1823 | 0 29 8 | ... | ... | 0 43 4 | ... | ... | ... | ... | ... | ... |
| 1824 | 0 34 4 | ... | ... | 0 44 6 | ... | ... | ... | ... | ... | ... |
| 1825 | 0 29 8 | ... | ... | 0 33 6 | ... | ... | ... | ... | ... | ... |
| 1826 | 0 20 6 | ... | ... | 0 19 8 | ... | ... | ... | ... | ... | ... |
| 1827 | 0 33 2 | ... | ... | 0 30 12 | ... | ... | ... | ... | ... | ... |
| 1828 | 0 35 4 | ... | ... | 0 43 8 | ... | ... | ... | ... | ... | ... |
| 1829 | 0 39 0 | ... | ... | 0 49 4 | ... | ... | ... | ... | ... | ... |
| 1830 | 0 40 2 | ... | ... | 0 49 4 | ... | ... | ... | ... | ... | ... |
| 1831 | 0 35 4 | 1 12 8 | ... | 0 42 10 | 1 11 0 | ... | ... | ... | ... | ... |
| 1832 | 0 37 8 | 1 15 0 | ... | 0 53 0 | 1 11 0 | ... | ... | ... | ... | ... |
| 1833 | 1 2 0 | 1 17 8 | ... | 1 7 8 | 1 8 8 | ... | ... | ... | ... | ... |
| 1834 | 0 27 8 | 0 37 8 | ... | 0 35 0 | 0 36 0 | ... | ... | ... | ... | ... |
| 1835 | 0 34 8 | 1 11 4 | ... | 1 6 0 | 1 7 0 | ... | ... | ... | ... | ... |
| 1836 | 1 4 0 | 1 15 0 | ... | 1 10 0 | 1 11 0 | ... | ... | ... | ... | ... |
| 1837 | 0 37 0 | 1 10 0 | ... | 1 5 0 | 1 6 0 | ... | ... | ... | ... | ... |
| 1838 | 0 20 0 | 0 24 4 | ... | 0 22 0 | 0 22 8 | ... | ... | ... | ... | ... |
| 1839 | 0 27 0 | 1 0 0 | ... | 0 35 0 | 0 36 0 | ... | ... | ... | ... | ... |
| 1840 | 0 27 8 | 0 38 0 | ... | 0 35 0 | 0 36 0 | ... | ... | ... | ... | ... |
| 1841 | 0 27 8 | 0 35 0 | ... | 0 32 0 | 0 33 0 | ... | ... | ... | ... | ... |
| 1842 | 0 33 8 | 1 2 8 | ... | 0 34 0 | 0 35 0 | ... | ... | ... | ... | ... |
| 1843 | 0 36 0 | 1 11 4 | ... | 1 6 0 | 1 7 0 | ... | ... | ... | ... | ... |
| 1844 | 0 37 8 | 1 20 0 | 2 2 10½ | 0 30 7 | 1 4 10 | 0 16 1½ | 0 9 8 | 0 2 4½ | 0 3 15 | 0 38 1 |
| 1845 | 0 36 2 | 1 25 0 | 2 3 5½ | 0 36 8 | 1 5 3 | 0 16 12 | 0 8 2 | 0 2 13 | 0 3 13 | 0 38 0½ |
| 1846 | 0 33 7½ | 1 11 4 | 1 32 12½ | 0 36 7 | 0 37 6 | 0 15 15 | 0 8 9 | 0 3 0 | 0 4 1 | 0 33 12 |
| 1847 | 0 33 6 | 1 0 0 | 1 35 10 | 0 36 8 | 1 0 13 | 0 15 15 | 0 8 0 | 0 2 13 | 0 3 13 | 0 37 8 |
| 1848 | 0 34 5 | 1 17 8 | 1 26 15½ | 0 36 10 | 1 1 11½ | 0 19 4 | 0 9 15 | 0 3 0 | 0 4 0 | 0 35 7½ |
| 1849 | 0 38 10 | 1 12 8 | 2 18 9 | 0 35 11 | 1 0 13 | 0 16 10 | 0 9 8½ | 0 2 5 | 0 5 4 | 0 29 5½ |
| 1850 | 1 6 2 | 1 25 0 | 3 5 8 | 1 1 8 | 1 14 1½ | 0 16 14½ | 0 11 12 | 0 2 0 | 0 5 8 | 1 0 5 |
| 1851 | 1 8 5½ | 2 5 0 | 2 36 2 | 1 12 2½ | 1 29 2 | 0 15 0 | 0 15 15½ | 0 2 15½ | 0 5 0 | 1 9 10 |
| 1852 | 0 29 11 | 1 2 8 | 1 31 2 | 0 31 5 | 0 36 1 | 0 15 5 | 0 12 15 | 0 3 6 | 0 5 0 | 0 27 10 |
| 1853 | 0 28 8 | 1 5 0 | 1 20 12½ | 0 29 8 | 0 30 10 | 0 15 14 | 0 8 5 | 0 3 0 | 0 5 11 | 0 26 11 |
| 1854 | 0 30 8 | 1 0 0 | ... | 0 35 0 | 0 36 0 | ... | ... | ... | ... | ... |
| 1855 | 1 0 0 | 1 11 0 | ... | 0 35 0 | 0 37 0 | ... | ... | ... | ... | ... |
| 1856 | 1 0 0 | 1 10 0 | ... | 1 5 0 | 1 6 0 | ... | ... | ... | ... | ... |
| 1857 | 0 37 8 | 1 12 8 | ... | 1 5 0 | 1 6 0 | ... | ... | ... | ... | ... |
| 1858 | 0 33 0 | 1 10 0 | ... | 1 5 0 | 1 6 0 | ... | ... | ... | ... | ... |
| 1859 | 0 32 0 | 1 7 0 | ... | 1 7 0 | 1 8 0 | 0 9 0 | 0 9 0 | 0 2 9 | 0 2 8 | 0 30 0 |
| 1860 | 0 20 0 | 0 23 0 | ... | 0 21 0 | 0 22 0 | 0 8 0 | 0 6 12 | 0 2 6 | 0 2 8 | 0 12 0 |
| 1861 | 0 16 0 | 0 20 0 | ... | 0 15 12 | 0 16 0 | 0 9 0 | 0 5 8 | 0 2 10 | 0 2 4 | 0 14 4 |

The quantities are given in Maunds, Seers and Chittacks of the Standard Weight.

III.—*Table showing the market price of Food-Grains, &c., at Agra, from* 1812 *to* 1861, *from various Records.**

| Year. | Wheat. | | | Barley. | | | Inferior Grains. | | | Gram. | | | Rice. | | | Straw for food (or white Bhusa). | | | Oil. | | | Ghee. | | | Sugar (Goor). | | | Dâl (Arhur). | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M. | S. | C. | M. | S. | C. | M. | S. | C. | M. | S. | C. | M. | S. | C. | M. | S. | C. | M. | S. | C. | M. | S. | C. | M. | S. | C. | M. | S. | C. |
| 1812 | 0 | 33 | 14 | 1 | 10 | 15 | 2 | 4 | 4 | 1 | 8 | 5 | 0 | 19 | 7 | 3 | 8 | 2 | 0 | 7 | 12 | 0 | 3 | 8 | 0 | 15 | 1 | 0 | 36 | 8 |
| 1813 | 0 | 20 | 9 | 0 | 25 | 3 | 1 | 9 | 1 | 0 | 21 | 7 | 0 | 15 | 10 | 2 | 12 | 3 | 0 | 5 | 13 | 0 | 3 | 6 | 0 | 12 | 14 | 0 | 16 | 5 |
| 1814 | 0 | 30 | 7 | 1 | 4 | 11 | 2 | 3 | 8 | 0 | 33 | 1 | 0 | 18 | 4 | 4 | 34 | 3 | 0 | 8 | 1 | 0 | 3 | 0 | 0 | 12 | 1 | 0 | 21 | 0 |
| 1815 | 1 | 1 | 9 | 1 | 22 | 7 | 2 | 31 | 15 | 1 | 7 | 15 | 0 | 20 | 3 | 4 | 33 | 3 | 0 | 9 | 15 | 0 | 3 | 9 | 0 | 16 | 12 | 0 | 36 | 11 |
| 1816 | 0 | 34 | 10 | 1 | 15 | 8 | 2 | 14 | 2 | 0 | 39 | 3 | 0 | 18 | 6 | 5 | 27 | 5 | 0 | 8 | 4 | 0 | 3 | 6 | 0 | 13 | 10 | 0 | 24 | 12 |
| 1817 | 0 | 28 | 0 | 0 | 39 | 10 | 1 | 24 | 4 | 0 | 32 | 1 | 0 | 14 | 3 | 3 | 36 | 5 | 0 | 6 | 0 | 0 | 3 | 7 | 0 | 9 | 3 | 0 | 24 | 8 |
| 1818 | 0 | 18 | 3 | 0 | 22 | 15 | 1 | 1 | 10 | 0 | 18 | 15 | 0 | 12 | 8 | 2 | 15 | 7 | 0 | 4 | 13 | 0 | 3 | 3 | 0 | 11 | 8 | 0 | 15 | 1 |
| 1819 | 0 | 17 | 0 | 0 | 22 | 12 | 1 | 3 | 6 | 0 | 20 | 9 | 0 | 12 | 8 | 3 | 7 | 9 | 0 | 3 | 14 | 0 | 2 | 9 | 0 | 10 | 4 | 0 | 10 | 11 |
| 1820 | 0 | 17 | 1 | 0 | 21 | 10 | 0 | 39 | 2 | 0 | 20 | 1 | 0 | 13 | 2 | 2 | 37 | 0 | 0 | 4 | 1 | 0 | 2 | 15 | 0 | 7 | 13 | 0 | 12 | 6 |
| 1821 | 0 | 26 | 14 | 0 | 37 | 15 | 1 | 28 | 7 | 0 | 26 | 1 | 0 | 16 | 10 | 2 | 39 | 7 | 0 | 5 | 14 | 0 | 2 | 8 | 0 | 10 | 1 | 0 | 22 | 12 |
| 1822 | 0 | 30 | 4 | 1 | 6 | 9 | 1 | 35 | 1 | 0 | 34 | 1 | 0 | 17 | 2 | 3 | 25 | 15 | 0 | 6 | 1 | 0 | 2 | 7 | 0 | 11 | 6 | 0 | 33 | 10 |
| 1823 | 0 | 24 | 5 | 0 | 35 | 1 | 1 | 18 | 15 | 0 | 39 | 9 | 0 | 14 | 8 | 3 | 0 | 7 | 0 | 5 | 6 | 0 | 2 | 3 | 0 | 11 | 0 | 0 | 34 | 13 |
| 1824 | 0 | 31 | 6 | 1 | 4 | 3 | 1 | 34 | 13 | 1 | 6 | 14 | 0 | 16 | 1 | 3 | 12 | 1 | 0 | 5 | 12 | 0 | 2 | 11 | 0 | 14 | 8 | 0 | 38 | 8 |
| 1825 | 0 | 27 | 14 | 0 | 36 | 2 | 1 | 19 | 9 | 0 | 36 | 12 | 0 | 15 | 6 | 2 | 34 | 5 | 0 | 5 | 12 | 0 | 2 | 10 | 0 | 12 | 2 | 0 | 36 | 9 |
| 1826 | 0 | 19 | 12 | 0 | 25 | 14 | 1 | 7 | 15 | 0 | 24 | 0 | 0 | 12 | 3 | 2 | 16 | 15 | 0 | 6 | 0 | 0 | 2 | 11 | 0 | 10 | 15 | 0 | 22 | 12 |
| 1827 | 0 | 21 | 14 | 0 | 32 | 10 | 1 | 25 | 10 | 0 | 33 | 9 | 0 | 13 | 2 | 3 | 18 | 6 | 0 | 6 | 3 | 0 | 2 | 8 | 0 | 9 | 1 | 0 | 30 | 12 |
| 1828 | 0 | 30 | 12 | 1 | 2 | 3 | 1 | 36 | 5 | 0 | 36 | 2 | 0 | 14 | 3 | 4 | 4 | 6 | 0 | 7 | 14 | 0 | 2 | 11 | 0 | 12 | 6 | 0 | 38 | 1 |
| 1829 | 0 | 36 | 4 | 1 | 11 | 11 | 2 | 11 | 4 | 1 | 10 | 0 | 0 | 18 | 0 | 3 | 31 | 2 | 0 | 9 | 8 | 0 | 2 | 10 | 0 | 14 | 13 | 1 | 3 | 9 |
| 1830 | 0 | 34 | 13 | 1 | 6 | 0 | 1 | 38 | 14 | 1 | 5 | 4 | 0 | 17 | 1 | 4 | 14 | 11 | 0 | 8 | 2 | 0 | 3 | 2 | 0 | 11 | 7 | 0 | 36 | 15 |
| 1831 | 0 | 31 | 7 | 0 | 39 | 7 | 1 | 23 | 5 | 0 | 39 | 5 | 0 | 18 | 2 | 3 | 35 | 3 | 0 | 7 | 15 | 0 | 3 | 4 | 0 | 12 | 6 | 0 | 23 | 3 |
| 1832 | 0 | 34 | 7 | 1 | 6 | 13 | 1 | 32 | 8 | 1 | 7 | 6 | 0 | 18 | 2 | 4 | 1 | 4 | 0 | 7 | 6 | 0 | 2 | 11 | 0 | 12 | 14 | 0 | 37 | 4 |
| 1833 | 0 | 31 | 2 | 0 | 39 | 11 | 1 | 23 | 7 | 0 | 37 | 13 | 0 | 17 | 8 | 3 | 9 | 9 | 0 | 5 | 5 | 0 | 2 | 11 | 0 | 14 | 2 | 0 | 32 | 3 |
| 1834 | 0 | 25 | 0 | 0 | 33 | 9 | 1 | 15 | 12 | 0 | 28 | 1 | 0 | 16 | 12 | 3 | 16 | 9 | 0 | 6 | 3 | 0 | 2 | 12 | 0 | 11 | 13 | 0 | 20 | 4 |
| 1835 | 0 | 29 | 9 | 1 | 2 | 14 | 2 | 0 | 10 | 0 | 35 | 11 | 0 | 16 | 5 | 4 | 0 | 0 | 0 | 6 | 3 | 0 | 2 | 2 | 0 | 11 | 3 | 0 | 17 | 0 |
| 1836 | 0 | 32 | 0 | 1 | 4 | 11 | 1 | 34 | 13 | 1 | 3 | 3 | 0 | 15 | 11 | 4 | 16 | 14 | 0 | 7 | 10 | 0 | 3 | 3 | 0 | 10 | 10 | 0 | 24 | 9 |
| 1837 | 0 | 23 | 3 | 0 | 29 | 9 | 1 | 11 | 11 | 0 | 29 | 9 | 0 | 12 | 9 | 2 | 38 | 5 | 0 | 6 | 9 | 0 | 3 | 1 | 0 | 11 | 10 | 0 | 20 | 0 |
| 1838 | 0 | 13 | 9 | 0 | 16 | 6 | 0 | 38 | 12 | 0 | 13 | 13 | 0 | 9 | 8 | 1 | 38 | 4 | 0 | 4 | 2 | 0 | 2 | 3 | 0 | 9 | 11 | 0 | 11 | 0 |
| 1839 | 0 | 20 | 4 | 0 | 28 | 10 | 1 | 25 | 2 | 0 | 24 | 9 | 0 | 14 | 11 | 3 | 33 | 9 | 0 | 6 | 6 | 0 | 2 | 2 | 0 | 12 | 6 | 0 | 23 | 1 |
| 1840 | 0 | 23 | 1 | 0 | 29 | 10 | 1 | 16 | 10 | 0 | 27 | 3 | 0 | 13 | 8 | 3 | 36 | 10 | 0 | 7 | 8 | 0 | 3 | 7 | 0 | 13 | 9 | 0 | 26 | 5 |
| 1841 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1842 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1843 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1844 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1845 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1846 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1847 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1848 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1849 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1850 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1851 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1852 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1853 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1854 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1855 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1856 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1857 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1858 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1859 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1860 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1861 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

* The quantities are given in Standard Weights per Rupee.

IV.—*Table showing the market price of Food-Grains, &c., in the District of Futtehpoor,* from* 1830 *to* 1861.

| Year. | Wheat. | Barley. | Boot Gram, 1st sort. | Boot Gram, 2nd sort. | Rice, 1st sort. | Mustard Oil. | Buffaloe Ghee. | Sugar. | Goor. | Dâl. |
|---|---|---|---|---|---|---|---|---|---|---|
| | M. S. C. | M. S. C. | M. S. C. | M. S. C. | M. S. C. | M. S. C. | M. S. C. | M. S. C. | M. S. C. | M. S. C. |
| 1830 | 0 22 9 | 0 30 9 | 0 29 2 | .. | 0 10 6 | 0 5 8 | 0 2 7½ | 0 3 2½ | 0 11 6½ | 0 18 9½ |
| 1831 | 0 24 12 | 0 31 4 | 0 29 15 | .. | 0 10 14 | 0 5 7½ | 0 2 11½ | 0 3 5½ | 0 12 9 | 0 17 2½ |
| 1832 | 0 26 11 | 1 0 11½ | 0 37 4 | 1 2 0 | 0 17 0½ | 0 5 11½ | 0 2 9½ | 0 3 8 | 0 14 1 | 0 22 2 |
| 1833 | 0 22 12 | 0 32 12 | 0 32 1½ | 1 0 0 | 0 10 13 | 0 6 1 | 0 2 8½ | 0 3 14 | 0 13 0½ | 0 20 5 |
| 1834 | 0 21 11½ | 0 25 13½ | 0 22 10 | 0 23 7 | 0 9 14 | 0 6 7½ | 0 2 10 | 0 4 0 | 0 11 2 | 0 16 2 |
| 1835 | 0 21 8 | 0 26 12 | 0 23 6 | 0 24 3½ | 0 9 13 | 0 6 8 | 0 2 10 | 0 4 0 | 0 11 7 | 0 16 3 |
| 1836 | 0 20 5 | 0 26 4 | 0 22 5½ | 0 0 0 | 0 10 4 | 0 5 10½ | 0 2 11 | 0 3 5½ | 0 10 7½ | 0 18 0 |
| 1837 | 0 19 11 | 0 24 10 | 0 24 0 | 0 25 3 | 0 10 5½ | 0 6 3 | 0 2 11 | 0 3 6 | 0 12 8 | 0 18 11½ |
| 1838 | 0 21 15 | 0 27 14 | 0 27 7 | 0 27 10½ | 0 10 8 | 0 7 3 | 0 2 6 | 0 3 12 | 0 12 3½ | 0 17 15½ |
| 1839 | 0 19 6 | 0 23 5 | 0 26 2 | 0 29 6 | 0 9 15 | 0 6 4 | 0 2 7½ | 0 3 1½ | 0 8 14 | 0 17 10½ |
| 1840 | 0 18 11½ | 0 23 5 | 0 27 0 | 0 28 10 | 0 9 12 | 0 6 5 | 0 2 11 | 0 3 0 | 0 9 15 | 0 20 13 |
| 1841 | 0 19 1 | 0 22 7 | 0 26 1 | 0 28 7 | 0 10 0 | 0 6 2½ | 0 2 7 | 0 2 12 | 0 8 9 | 0 18 10 |
| 1842 | 0 22 8 | 0 25 11½ | 0 36 12 | 0 28 12 | 0 11 1 | 0 4 15½ | 0 2 3 | 0 3 13 | 0 11 9 | 0 14 10 |
| 1843 | 0 25 2½ | 0 28 9 | 0 21 7½ | 0 32 14½ | 0 10 4 | 0 6 1 | 0 2 1 | 0 3 12 | 0 11 8 | 0 19 2 |
| 1844 | 0 23 11¼ | 0 30 14 | 0 26 8½ | 0 26 10 | 0 10 3 | 0 7 4 | 0 2 3 | 0 3 7 | 0 10 13 | 0 16 14 |
| 1845 | 0 21 8 | 0 30 7½ | 0 28 1½ | 0 29 7½ | 0 11 1 | 0 5 10 | 0 2 2½ | 0 3 7½ | 0 10 11½ | 0 21 5 |
| 1846 | 0 22 0 | 0 30 14 | 0 31 13 | 0 32 10 | 0 10 14 | 0 4 15½ | 0 2 10 | 0 3 7 | 0 10 11 | 0 21 6½ |
| 1847 | 0 24 0 | 0 30 15½ | 0 31 12 | 0 33 2 | 0 10 2½ | 0 7 8½ | 0 2 12 | 0 3 11½ | 0 11 3½ | 0 22 10 |
| 1848 | 0 27 15½ | 0 31 12½ | 0 34 1 | 0 35 8 | 0 10 10 | 0 8 13 | 0 2 3 | 0 3 15 | 0 12 12 | 0 23 15½ |
| 1849 | 0 30 15½ | 1 0 4 | 0 37 5½ | 0 39 11 | 0 10 15½ | 0 9 7½ | 0 2 4 | 0 1 8 | 0 13 10 | 0 17 0 |
| 1850 | 0 25 13 | 1 1 8 | 1 1 7 | 1 1 12 | 0 11 8 | 0 10 12 | 0 2 6½ | 0 4 3 | 0 13 8½ | 0 24 9 |
| 1851 | 0 33 3 | 1 27 5½ | 1 20 11½ | 1 23 15½ | 0 16 15 | 0 12 12 | 0 2 9 | 0 4 4 | 0 15 12 | 1 0 14½ |
| 1852 | 0 26 4 | 0 39 0 | 0 39 13 | 1 4 8 | 0 22 11 | 0 8 3 | 0 3 8 | .. | 0 13 11½ | 0 28 12½ |
| 1853 | 0 27 8½ | 0 39 11½ | 1 1 1½ | .. | 0 17 12 | 0 8 3½ | 0 3 10 | 0 5 8½ | 0 11 10½ | 0 32 0 |
| 1854 | 0 31 8 | 1 0 5 | .. | 0 29 10 | 0 21 4½ | 0 6 8½ | 0 2 13 | .. | 0 14 3 | 0 25 5½ |
| 1855 | 0 29 14 | 1 5 0 | 0 30 3½ | 0 31 11 | 0 22 5 | 0 5 4 | 0 3 0 | 0 5 0 | 0 16 1 | 0 29 5 |
| 1856 | 0 23 10½ | 0 30 ½ | .. | 0 31 11½ | 0 20 10½ | 0 6 3½ | 0 3 6 | .. | 0 16 1 | 0 24 2½ |
| 1857 | 0 17 6 | 0 32 5 | 0 32 1½ | .. | 0 19 1 | .. | 0 2 9½ | 0 6 4 | 0 14 6½ | 0 28 15½ |
| 1858 | 0 20 2 | 0 27 6 | 0 28 1½ | .. | 0 14 1 | .. | 0 2 3½ | 0 6 4 | 0 11 7½ | 0 24 12½ |
| 1859 | 0 21 2 | 0 32 14½ | 0 26 3 | .. | 0 17 2 | 0 4 10 | 0 2 0 | 0 5 13½ | 0 9 4 | 0 23 4 |
| 1860 | 0 20 ½ | 0 26 8 | 0 23 12 | .. | 0 16 9½ | 0 3 15½ | 0 2 1 | 0 5 12 | 0 10 3½ | 0 20 10½ |
| 1861 | 0 18 12 | 0 22 10½ | 0 18 ½ | .. | 0 15 0 | 0 5 0 | 0 1 14½ | 0 5 1½ | 0 10 12 | 0 20 5 |

* This District was formed in 1826.

V.—*Table showing the market price of Food-Grains, &c., in the District of Cawnpoor, from* 1823 *to* 1861.

| Year. | Wheat. | Barley. | Gram, 1st sort. | Gram, 2d sort. | Rice, 1st sort. | Mustard Oil. | Buffaloe Ghee. | Sugar. | Dál. | Paddy Straw, or Bhusa (fodder for Cattle.) |
|---|---|---|---|---|---|---|---|---|---|---|
| | M. S. C. | M. S. C. | M. S. C. | M. S. C. | M. S. C. | M. S. C. | M. S. C. | M. S. C. | M. S. C. | M. S. C. |
| 1823 | 0 19 11 | 0 28 6 | 0 31 5 | 0 32 8½ | 0 13 13 | 0 5 3 | 0 2 14 | 0 3 12 | 0 28 10 | 1 3 12 |
| 1824 | 0 24 4 | 0 35 7 | 0 34 1 | 0 36 0 | 0 11 7 | 0 5 14 | 0 2 7 | 0 3 15½ | 0 32 14 | 3 4 11 |
| 1825 | 0 26 9 | 0 35 6½ | 0 32 13 | 0 34 9 | 0 9 7½ | 0 5 14 | 0 2 5½ | 0 4 1½ | 0 35 2 | 3 15 1 |
| 1826 | 0 15 2 | 0 19 9 | 0 18 10½ | 0 19 4 | 0 8 8 | 0 4 15 | 0 2 9 | 0 3 10 | 0 17 3 | 2 12 11 |
| 1827 | 0 16 15 | 0 26 7 | 0 21 12 | 0 22 13 | 0 9 1 | 0 4 7 | 0 2 3 | 0 3 4 | 0 21 13 | 3 8 4 |
| 1828 | 0 31 4 | 1 10 15½ | 0 41 13 | 0 44 4 | 0 10 9½ | 0 6 10½ | 0 2 7 | 0 3 5 | 0 36 15½ | 4 6 15 |
| 1829 | 0 33 1 | 1 15 1 | 0 47 8½ | 1 11 7 | 0 11 9 | 0 8 4 | 0 2 9 | 0 3 11 | 1 1 9 | 3 31 15 |
| 1830 | 0 27 10 | 1 0 2 | 0 38 4 | 0 39 6 | 0 11 12 | 0 6 3 | 0 2 10 | 0 3 12½ | 0 28 6 | 2 14 5 |
| 1831 | 0 26 1 | 0 35 2 | 0 32 15½ | 0 33 13 | 0 12 3½ | 0 5 15 | 0 2 14½ | 0 3 11½ | 0 19 2 | 3 5 9 |
| 1832 | 0 30 0 | 1 5 9 | 1 0 7 | 1 1 11 | 0 11 9 | 0 6 7½ | 0 2 15 | 0 3 12 | 0 31 12 | 5 4 9½ |
| 1833 | 0 28 10 | 0 39 8 | 0 36 15 | 0 38 6 | 0 11 9 | 0 6 10 | 0 2 10½ | 0 4 8½ | 0 30 5½ | 3 30 15 |
| 1834 | 0 26 3 | 0 34 10 | 0 27 6 | 0 28 10 | 0 11 9 | 0 6 1 | 0 2 12½ | 0 4 7 | 0 19 4 | 3 10 2 |
| 1835 | 0 28 1 | 0 39 10 | 0 31 8 | 0 33 9 | 0 10 6 | 0 6 ½ | 0 2 6½ | 0 4 5 | 0 19 2 | 4 10 7½ |
| 1836 | 0 24 12 | 0 32 3 | 0 28 12 | 0 30 3 | 0 9 ½ | 0 5 5 | 0 3 ½ | 0 3 11½ | 0 24 12 | 3 32 1½ |
| 1837 | 0 19 ½ | 0 22 14½ | 0 22 1 | 0 22 14 | 0 8 8 | 0 5 2½ | 0 2 15 | 0 3 8 | 0 19 0 | 2 19 6 |
| 1838 | 0 14 15 | 0 18 5 | 0 15 6 | 0 15 15 | 0 8 3 | 0 5 4 | 0 2 5 | 0 4 9 | 0 14 7 | 2 13 10 |
| 1839 | 0 20 2 | 0 32 0 | 0 26 2 | 0 27 2 | 0 8 5 | 0 6 15 | 0 2 4 | 0 3 7 | 0 23 10 | 4 1 11 |
| 1840 | 0 20 5 | 0 30 6 | 0 27 8 | 0 28 8 | 0 8 0 | 0 7 15½ | 0 3 2 | 0 3 6 | 0 23 9 | 3 38 12 |
| 1841 | 0 22 14 | 0 29 9 | 0 29 4 | 0 30 4 | 0 8 11 | 0 7 9 | 0 2 14 | 0 3 4 | 0 20 11 | 3 12 0 |
| 1842 | 0 25 10 | 0 34 14 | 0 31 0 | 0 31 15 | 0 8 7 | 0 5 15 | 0 2 10 | 0 3 14 | 0 18 13 | 3 15 0 |
| 1843 | 0 29 ½ | 1 3 7 | 0 35 10 | 0 36 10 | 0 7 9 | 0 7 2 | 0 2 8 | 0 3 14 | 0 21 13 | 3 11 0 |
| 1844 | 0 27 12 | 1 2 3½ | 0 30 9 | 0 31 8 | 0 7 1 | 0 7 14 | 0 2 7 | 0 3 12 | 0 19 10 | 3 2 8 |
| 1845 | 0 26 1 | 1 0 13½ | 0 31 13 | 0 32 13 | 0 7 0 | 0 7 6 | 0 2 10 | 0 3 8 | 0 24 15 | 3 1 0 |
| 1846 | 0 25 6 | 0 37 5 | 0 34 1 | 0 35 1 | 0 6 15 | 0 6 4 | 0 2 15 | 0 3 10 | 0 26 0 | 2 35 9 |
| 1847 | | | | | | | | | | |
| 1848 | | | | | | | | | | |
| 1849 | | | | | | | | | | |
| 1850 | | | | | | | | | | |
| 1851 | | | | | | | | | | |
| 1852 | | | | | | | | | | |
| 1853 | | | | | | | | | | |
| 1854 | | | | | | | | | | |
| 1855 | | | | | | | | | | |
| 1856 | | | | | | | | | | |
| 1857 | | | | | | | | | | |
| 1858 | | | | | | | | | | |
| 1859 | | | | | | | | | | |
| 1860 | | | | | | | | | | |
| 1861 | | | | | | | | | | |

# APPENDIX II.

*ACCOUNT of the Famine of* 1837-38 *in the District of Furruckabad. From an Old M.S. History of the District, supplied by Mr. Charles Lindesay, the Collector and Magistrate.*

Origin of the distress.

83. In the year 1837, the periodical rains did not make their anxiously wished for appearance, and drought soon became a terrible certainty. The soil was parched,—and, where irrigation was not available, produced nothing. Famine, with all its attendant horrors, spread over the land, and the poor miserable villagers, agriculturists and others who were most exposed to its influence, fled in panic from their homes, and crowded in masses at the sudder station. Famished with hunger, they were prepared to commit any excesses to procure food; and crime stalked with gigantic strides in the face of daylight.

Its consequences.

84. To see human beings gaunt and naked, creeping along the streets, trying to sustain their emaciated bodies with whatever they could pick up;—to see others too old and feeble to move, quietly lay themselves down on the highroads to die;—to see parents bartering their offspring for a meal;—these are all well known scenes that follow in the trail of famine; and these were not wanting to complete the picture of horror in the calamitous and memorable year 1837. Villages were depopulated; wells and ditches were filled with dead bodies; the aspect of the country was deplorable in the extreme, and many years elapsed ere the famine-struck estates recovered from their state of prostration. But it is feared that the revenue has received a shock from which it will not recover for the next twenty years: it is now some too lacs below what it was previously to the famine.

85. It is, however, with no small degree of satisfaction that we now look back to find, that amidst these harrowing details, all that sympathy and benevolence could do to administer relief to suffering humanity,—all that the firmness and unflinching energy of an able and vigorous Magistrate could do to preserve order and tranquillity, and keep in check, as far as was possible, the over-wrought passions of a starving multitude,—all was done, and well done, in that period of fearful excitement,—the necessities of which called into active exercise our best energies.

Prevalence of crime arising from suffering.

86. In the month of August 1837, the scourge first began to be felt. In consequence of the rise in the price of grain, the sufferings of the lower classes, especially the agriculturists, became very severe; and as there was but faint prospect of a remunerative Khureef harvest, the *Buneeas* commenced removing to the markets the grain stored in the villages, and also to withhold that subsistence in corn and money, which, in this part of the country, was all that the agricultural laborer had to trust to for his livelihood. This conduct, however natural on the part of the *Buneeas*, roused the worst passions of the people, and a systematic plunder of the grain stores took place all over the suffering parts of the country. The first acts of outrage commenced in the Bareilly District, and the contagion flew like wildfire over the neighbouring Zillahs. In August the Magistrate received the startling information that the navigation of the River Ganges was stopped at *Soorujpore Ghaut* in *Suheswan* by a set of turbulent Zemindars; and that the grain merchants of the city had written to stop all despatches of grain till the river was cleared, and adequate

protection afforded. The *Kotwal* was despatched to enforce order,—and had he failed, it was Mr. Robinson's intention to proceed in person to the spot with a party of the military. The *Kotwal*, however, made considerable progress in setting matters right on the river. He seized some of the ringleaders in these outrages with good proof:—a party of Police from *Suheswan* were also sent to the scene of disorder, and with the united aid of the *Kotwal's* and *Thannadar's* parties a large quantity of grain was recovered. As an instance of the dangerous state of the roads at that time, it may be remarked that the Camel Sowar, who had been despatched by the Magistrate with instructions to the *Kotwal*, was fired at on the way.

Auxiliary Police Force.

87. Intelligence was also received of the formation of a large gang of plunderers in Oudh, who were represented to be on the point of falling upon this district. To resist this threatened attack, Mr. Robinson commenced raising a body of 500 *Seebundees* as an auxiliary force which, he rightly judged, would afford employment to a number of dangerous characters, and convert them into useful instruments for repressing outrage. The Commissioner, however, discouraged any extra expense being incurred in this way, and Mr. Robinson in consequence limited his levy to 300. A party of these men were detached to dislodge the gang of Oudh plunderers who had moved to an island opposite to *Singerampore*; but they were not dispersed before they had plundered a village in the Imrutpore Pergunnah.

Extra Road and River Chowkees.

88. Additional Chowkees were planted on the high roads and on the banks of the river. The boats were principally plundered on the Suheswan side of the river, not so much on this side, but the Magistrate posted his own men on both sides of the Ganges to protect boats and preserve order. "From Peleebheet to Etwah,"—wrote Mr. Robinson,—"the whole country is one scene of plunder and confusion,"—and he adds that this information was derived from Europeans as well as Natives.

89. It is satisfactory to be able to state that, principally through the timely and energetic measures of the Magistrate, the riotous assemblages of the people for the purpose of plunder were soon put down; but this Officer did not fail to press upon Government the necessity of providing food for the starving population;—here is an extract from one of his reports:—"To promise general tranquillity, or any thing like tranquillity, till food is attainable for the starving population, I do not pretend. It is very true that grain, though dear, is not at famine price; but the cheapness or dearness of food matters little to men who have no means of procuring it except robbery. This is the actual condition of the laboring population, and till these men can obtain employment and subsistence, the present outrages cannot be put down by the ordinary strength of the Police."

Government Relief.

90. Government were not slow to respond to this appeal, and the sum of 1,000 Rupees per mensem was placed at the Magistrate's disposal. This was an opportune relief which answered for a time, but its insufficiency soon became manifest. Finding the distress increasing, and prices rising, wheat on 6th September selling at only 11¾ seers per Rupee, and the number of famished emigrants from the villages advancing to a formidable extent, Mr. Robinson took it upon himself to augment the expenditure from the State, in making roads, to 50 Rupees a day. The urgency of the measure secured its approval, and the allowance of 1,000 Rupees, which had been so recently sanctioned, was voluntarily doubled. Yet even this was unavailing to grapple with the fearful destitution that prevailed; for although a large number of persons found employment on the roads, yet in spite of all palliations, the evil increased daily, and our streets were crowded with perishing creatures, to whose miseries were now added the sufferings resulting from excessive cold. To such a height did the distress arise, that in December Mr. Robinson felt himself constrained to make another application to Government to place in his hands an additional sum of 2,000 Rupees per mensem for the next three months, which he considered would be the crisis of the

distress, as after that period the Rubbee harvest would, it was expected, come gradually into the market, and the weather become more temperate. The promptitude and liberality with which this request was acknowledged, reflects the highest credit on the generous and humane feelings of the Government, inasmuch as a ready permission was accorded to the Magistrate to make disbursements from the public treasury, *to any amount without limit* for the employment of the destitute on works of public utility. In communicating this exceedingly gratifying intelligence, the Secretary to Government ( a gentleman whose sterling merits have since raised him to the highest office in the Agra Presidency) wrote as follows :—" This expenditure is sanctioned not with a view to the profitable outlay of capital, but as a criterion by which to judge of the real state of distress that is prevailing."

Private Contributions.

91. Private charity was not withheld. The European community subscribed on an average 600 Rupees a month, and relief was dispensed by a Committee composed of several of the residents. Their operations were limited to assisting those who, from age, infirmity, or sex, were the greatest objects of compassion. The old *Shahzada's Kotee*, a large building with a spacious enclosure, was occupied as an asylum, and each day a Member of the Committee proceeded thither, and caused the provisions to be weighed and served out in his own presence. At first money was given, but it was afterwards found to be a better plan to distribute rations.

92. The Native community in the City subscribed nearly 1,500 Rupees a month, which was, in like manner, distributed by one of their number according to a regulated scale. The Hon'ble the Lieutenant-Governor, in a letter to the Magistrate, expressed his commendations of the liberality displayed by the Native Relief Society, and his gratification at their exertions. The laudation was wound up by a donation of a thousand Rupees.

93. These regular subscriptions were independent of much casual charity, the amount of which there were no means of estimating. But it may here be stated that the sum of 6,000 Rupees was handsomely contributed by the Committee formed in Calcutta for the relief of sufferers by famine in these Provinces, although this succour did not arrive until the severity of the calamity had begun to abate.

Height of the distress.

94. Some idea of the vast amount of suffering population that had flocked into the station may be formed, when it is stated that although nearly a thousand persons received daily employment and support from private subscriptions, and about the same number from the Government fund, yet the applicants for employment on the roads generally exceeded by one-third the number that could be employed. The City and Cantonments were filled with starving families; and hundreds of people were glad to give up their children to any one who would take them at from 8 annas to 4 Rupees a child, and many begged of people to take them for nothing!

Mode of employing the famishing poor.

95. When the Government first offered relief to the people in the shape of wages for labor, about 1,500 men were employed in the neighbourhood of the station under the voluntary superintendence of several residents. When the laborers were removed to a greater distance, a certain number of hired Native Overseers were allotted to each gang of workmen in the proportion of two to every hundred, and a Jemadar to superintend the whole. The work executed was checked and pronounced upon by the European Officers of the Executive Engineer. The large horde of unfortunates, who had collected in the vicinity of the town, attracted by the indiscriminate yet inadequate alms distributed by individuals, independently of the Native Relief Society, was broken up, and the people sent off in gangs of 500 to the various Pergunnahs where local employment was found for them. Two gangs of a thousand each were employed in constructing two important roads leading towards Cawnpore and Mynpoorie; and a third gang of the same strength was kept at the station.

96. Besides the relief thus afforded by Government, the Road Fund Committee gave contracts for two other extensive roads, which gave employment to about a thousand persons daily at regular wages,—not at the pauper rates allowed by the Magistrate as the Agent of Government. The strong and able-bodied were selected for working on these roads, and there was much trouble in preventing the idle from deserting from their labor, and coming back as fresh applicants for relief;—this was at length checked by marking these men with *mehudie*, a dye that cannot be effaced from the human skin and nail for weeks.

System of Diet.

97. The other gangs were fed upon the following system :—Each person had two tickets given him, one his admission-ticket which he was required to show before he set to work, and one his ration-ticket which he received at the conclusion of his work, and made over to the *Buneea* who gave him his rations; and when all were supplied, made up his account with the Superintendent of the gang, presenting these tickets as his vouchers. The scale of allowances given to the different classes is subjoined, by which it will be seen that the amount of food was judiciously regulated according to the degree of labor required.

| | Proportion assigned to each. | | | |
|---|---|---|---|---|
| | Atta. | Dâl. | Salt. | Fuel, &c. |
| Diggers, and persons employed to carry off the earth dug by them ... ... ... ... ... | 12 Chittacks. | 2 Chittacks. | 1 pice in weight. | 1 pie. |
| Men, and women with infants ... ... ... | 10 Ditto. | 2 Ditto. | Ditto. | Ditto. |
| Women and orphan children able to cook for themselves ... | 8 Ditto. | 2 Ditto. | Ditto. | Ditto. |
| Children above 10 years old, having parents, requiring less as they were with them ... ... ... | 8 Ditto. | ... | ½ Ditto. | ... |
| Ditto under 10 years, ditto ... ... ... ... | 6 Ditto. | ... | Ditto. | ... |

Each class was furnished with a different shaped wooden ticket to which was affixed the private or official seal of the distributor. The best effects resulted from the substitution of rations for pice. The people were no longer able to supply themselves with the adulterated and unwholesome food furnished on low terms to them by the *Buneeas*, which was the principal cause of the great mortality that prevailed.

Cholera in Pergunnah Sukutpore.

98. In the Pergunnah of *Sukutpore* cholera broke out in May 1838, and out of a gang of 600 poor, 20 died in seven days, and the mortality in the villages was reported to be heavy. Mr. Robinson sent out a supply of medicines, with instructions for use, to the Native local Officers of the Pergunnah.

99. In May 1838, Mr. Robinson ventured to discharge the additional Police horsemen he had entertained, and from the circumstance of the harvest having been gathered in, and the country being quiet, he hoped to be able to relieve the treasury of the burden of the remaining extra establishment very shortly; but in this he was disappointed,—the rains held off, and agricultural operations had commenced to a very slight extent;—the consequence was that the destitute poor, from whom public employment had been withdrawn, had no means of subsistence, and they resorted to plundering the mangoe groves and grain shops with the avowed object of getting into Jail. The Government support had therefore to be revived, and it was not until the end of August that the prospects of the season were sufficiently promising to justify the final discharge of the whole extra establishment.

100. It is satisfactory to know, that although large sums of money had, of necessity, to pass through the hands of the subordinate Native Officials, yet there were not more than ten unimportant cases of embezzlement and fraud brought to light.

101. At the time of the disturbances created in the district when the famine made itself felt, the Nawab Hakeem Mehudee, influenced by a praise-worthy public spirit, came forward promptly to the assistance of the Magistrate, and placed at his disposal the whole of his guns and retainers. A public acknowledgment was made by Mr. Robinson for this piece of service.

102. In contrast to this act, the King of Oudh issued a mandate, prohibiting the exportation of grain from his own to the Company's territories. Some correspondence took place on the subject between the Government and His Majesty, and the prohibition was eventually rescinded.

Mr. D'Gruyther.

103. In all his arrangements to alleviate the overwhelming distress of that period, Mr. Robinson was ably assisted by Mr. D'Gruyther; and in one of his letters to the Commissioner Mr. Robinson thus acknowledges his services :—"I cannot conclude this report without bearing testimony to the "merits of Mr. D'Gruyther, the Deputy Collector, through whose judicious and laborious exer-"tions the present system has been reduced to practice, and a great extent of abuse or fraud "suppressed or prevented."

*Memorandum of Government Relief.*

| Month. | Expenses of Establishment. | Expenses of Feeding or Pay. | Total. | Total Number of poor relieved | Average cost per diem,—exclusive of Establishment. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Men. | | Women. | | Children. | |
| | | | | | No. | Amount | No. | Amount. | No | Amount. |
| **1837.** | | | | | | | | | | |
| August ... | 15 2 4 | 479 4 3 | 494 6 7 | 9,848 | 109 | 6 13 7 | 137 | 6 6 7 | 72 | 2 4 1 |
| September .. | 74 3 4 | 1,751 8 6 | 1,825 11 10 | 35,508 | 433 | 27 1 3 | 499 | 23 6 1 | 254 | 7 14 9 |
| October . | 51 4 3 | 1,833 6 6 | 1,884 10 9 | 36,990 | 399 | 25 1 5 | 491 | 27 11 2 | 203 | 6 5 7 |
| November .. | 105 10 10 | 1,269 8 0 | 1,375 2 10 | 21,965 | 351 | 25 13 3 | 293 | 13 11 6 | 89 | 2 12 3 |
| December ... | 58 0 0 | 1,495 12 0 | 1,553 12 0 | 25,632 | 445 | 31 13 5 | 366 | 13 6 6 | 96 | 3 0 0 |
| **1838.** | | | | | | | | | | |
| January . | 130 5 5 | 6,715 1 9 | 6,845 7 2 | 1,38,778 | 1,472 | 102 5 1 | 1,753 | 82 6 3 | 1,127 | 31 15 6 |
| February ... | 451 11 5 | 13,433 3 3 | 13,884 14 8 | 2,73,468 | 2,875 | 196 1 8 | 4,948 | 220 7 2 | 1,917 | 54 3 3 |
| March ... | 883 6 8 | 26,712 4 6 | 27,595 11 2 | 4,70,346 | 7,403 | 498 9 5 | 5,368 | 279 3 0 | 2,543 | 83 14 6 |
| April ... | 579 7 2 | 20,012 4 8 | 20,591 11 10 | 3,59,041 | 4,781 | 330 5 4 | 4,836 | 260 4 1 | 2,351 | 76 7 9 |
| | | | | | | | | | | Total of average |
| May ... | 270 9 5 | 25,642 15 4 | 25,913 8 9 | 4,59,045 | 6,227 | ..... | 5,238 | ..... | 3,352 | 827 3 1 |
| June ... | 280 9 4 | 33,328 11 8 | 33,609 5 0 | 5,30,691 | 7,473 | ..... | 6,161 | ..... | 4,056 | 1,110 15 4 |
| July ... | 194 15 8 | 21,197 6 1 | 21,392 5 9 | 3,50,532 | 4,472 | ..... | 4,334 | ..... | 2,501 | 683 12 7 |
| August ... | 72 0 6 | 5,974 14 9 | 6,046 15 3 | 1,06,493 | 1,320 | ..... | 1,611 | ..... | 505 | 192 11 10 |
| Total ... | 3,167 6 5 | 1,59,846 5 3 | 1,63,013 11 8 | 28,24,397 | | | | | | |

Rations were substituted from April 1838 for pice to prevent peculation,—to put a stop to the use of adulterated and unwholesome food furnished on low terms by *Buneeas*, and to ensure a sufficient quantity of diet daily. It is a well-attested fact, however incredible it may appear, that the *Buneeas* mixed sand and pulverised bones with the *Atta* to increase the quantity!

*Statement of Crime and Extra Police.*

| Month. | Monthly cost of the extra Establishment. | Dacoity, Highway-robbery, Burglary and Theft attended with Murder or Wounding. | Dacoity, Highway-robbery, Burglary, and Theft unattended with aggravating circumstances. |
|---|---|---|---|
| 1837. | Rs. As. P. | | |
| June - - - - | ..... | 9 | 165 |
| July - - - - | ..... | 5 | 211 |
| August - - - | 451 11 3 | 77 | 292 |
| September - - - | 1,005 7 9 | 16 | 338 |
| October - - - | 545 0 0 | 14 | 79 |
| November - - - | 536 0 0 | 7 | 209 |
| December - - - | 536 0 0 | 5 | 199 |
| 1838. | | | |
| January - - - | 536 0 0 | 5 | 297 |
| February - - - | 528 0 0 | 3 | 316 |
| March - - - | 763 7 9 | 5 | 239 |
| April - - - - | 893 0 0 | 7 | 240 |
| May - - - - | 763 9 6 | 14 | 244 |
| June - - - - | 528 0 0 | 16 | 392 |
| July - - - - | 294 11 3 | 10 | 415 |
| Total - | 7,341 15 6 | 179 | 3,260 |

*The following account of the private Relief Fund may be interesting; it extends from* 18*th August,* 1837, *the date on which aid was first given, to* 31*st August,* 1838 :—

| Cantonment Fund. | Subscriptions from residents at the Station. | Received from other Stations. | Total. | Expended. | Number of persons relieved; including sick and orphans. |
|---|---|---|---|---|---|
| 1837. | Rs As. P. | Rs. As. P. | Rs. As. P. | Rs. As. P. | |
| August ... ... ... | 2,379 12 0 | ... | 2,379 12 0 | 303 7 0 | 6,942 |
| September ... ... ... | | | | 801 6 3 | 22,593 |
| October ... ... ... | 640 14 0 | ... | 640 14 0 | 942 12 4 | 23,589 |
| November ... ... ... | 529 4 0 | 55 0 0 | 584 4 0 | 810 13 4 | 20,173 |
| December ... ... ... | 1,488 14 0 | 80 0 0 | 1,568 14 0 | 898 12 11 | 22,430 |
| 1838. | | | | | |
| January .. . . | 286 7 0 | 740 0 0 | 1,026 7 0 | 925 3 2 | 22,417 |
| February .. ... .. | 478 2 0 | 100 0 0 | 578 2 0 | 553 14 3 | 12,323 |
| March ... ... ... | 406 2 0 | 2,600 0 0 | 3,006 2 0 | 506 9 11 | 14,608 |
| April ... ... .. | 1,224 0 0 | 6,150 0 0 | 7,374 0 0 | 1,706 12 9 | 37,364 |
| May ... ... ... | 526 0 0 | 2,250 0 0 | 2,776 0 0 | 2,900 5 9 | 64,821 |
| June ... ... ... | 542 0 0 | 50 0 0 | 592 0 0 | 4,006 6 8 | 78,484 |
| July ... ... ... | 540 0 0 | .. | 540 0 0 | 2,136 4 6 | 46,075 |
| August ... ... ... | 489 0 0 | 2,000 0 0 | 2,489 0 0 | 1,135 15 5 | 22,066 |
| City Fund. | | | | | |
| September 1837 to March 1838 .. | 3,847 8 6 | 1,600 0 0 | 5,447 8 6 | 5,342 4 6 | 1,53,147 |
| Total ... | 13,467 15 6 | 15,625 0 0 | 29,092 15 6 | 24,140 12 9 | 5,47,025 |

# APPENDIX III.

*MEMORANDUM on the Motive Power available at the Falls of the Ganges Canal. From the Supplement to the Agra "Government Gazette" of the 12th of May* 1857.

*Roorkee, the* 15*th April* 1857.

1*st.*—It has occurred to me that if some definite information regarding the Motive Power available on the Ganges Canal were circulated for the information of the Public, capitalists might find it expedient to turn this power to account in various ways that promise profitable returns, while at the same time the Revenue from the Canal might be materially improved. Under these impressions the following notes have been prepared :—

2*nd.*—The districts through which the Canal passes are, as is well known, among the most fertile and flourishing in the Empire. They are 11 in number, *viz.*, Saharunpore, Moozuffernugger, Meerut, Boolundshuhur, Fugtteghgur, Agra, Muttra, Allyghur, Mynpoorce, Etawah and Cawnpore. The staple products are sugar, rice, indigo, cotton, cereals, oil seeds of various kinds, and many others of minor importance. They will be partially traversed by the East Indian Railway, and will have, by June next, uninterrupted water communication from their Northern extremity at Hurdwar to Cawnpore, and thence by the Ganges to Calcutta. Sugar mills, rice mills, cotton cleaning and packing apparatus, oil mills, and probably other varieties of machinery might be introduced into them with certainty of abundant water power as the prime mover, and the probability of fair and, it might be, large profits on their operations.

3*rd.*—The water power would be found at the various Falls on the line of the Canal between Hurdwar, the Cawnpore Terminal on the Ganges, and the Etawah Terminal on the Jumna. The works on the last-mentioned line will not be completed, however, for about two years, though some of the Falls may be brought into use if necessary before that time.

4*th.*—The distribution of the Falls and the districts in which they are situated are as follow:—

| | | |
|---|---|---|
| In Saharunpore ... ... ... ... ... | | 4 of 9 feet each. |
| Ditto ... ... ... ... ... | | 2 of 8 „ |
| In Moozuffernugger ... ... ... ... ... | | 3 of 8 „ |
| In Meerut ... ... ... ... ... ... | | 3 of 8 „ |
| In Boolundshuhur ... ... ... ... ... | | 1 of 5 „ |
| In Allyghur ... ... ... ... ... ... | | 1 of 5 „ |
| In Cawnpore ... | Ganges Terminus... ... ... | 5 of 9 „ |
| | Jumna Terminus ... ... ... | 11 of 8½ „ |

*5th.*—The following Statement shows the effective power for mechanical purposes available in each of the districts above-mentioned:—

| Districts. | Number of Falls. | Height of each Fall. | Ultimate effective Power at each Fall. | Total effective Power. | Present effective Power at Fall. | Total present effective Power. |
|---|---|---|---|---|---|---|
| Saharunpore ... | 4 | 9 | 4,328 H. P. | 17,312 H. P. | 1,704 H P. | 6,816 H. P. |
| Ditto ... ... | 2 | 8 | 3,850 „ | 7,700 „ | 1,515 „ | 3,030 „ |
| Moozuffernugger | 2 | 8 | 3,850 „ | 7,700 „ | 1,515 „ | 3,030 „ |
| Ditto ... ... | 1 | 8 | 2,157 „ | 2,157 „ | 1,370 „ | 1,370 „ |
| Meerut ... ... | 1 | 8 | 2,157 „ | 2,157 „ | 1,370 „ | 1,370 „ |
| Ditto ... ... | 2 | 8 | 1,893 „ | 3,786 „ | 1,042 „ | 2,084 „ |
| Boolundshuhur | 1 | 5 | 1,183 „ | 1,183 „ | 651 „ | 651 „ |
| Allyghur ... | 1 | 5 | 1,183 „ | 1,183 „ | 651 „ | 651 „ |
| Cawnpore ... | 5 | 9 | 169 „ | 845 „ | 169 „ | 845 „ |
| | 11 | 8·5 | 160 „ | 1,760 „ | 0 „ | 0 „ |
| Total ... | 30 | 0 | 0 | 45,783 H. P. | 0 | 19,847 H. P. |

A few explanations will make the Statement clear. The results in the last four columns are given in horse power, it being assumed that such forms of water-wheels would be used as would give an useful effect, equal, on the average, to two-thirds of the total power of the water. The volumes at each Fall exclude entirely the quantities of water that must be reserved for irrigation, and also the supplies of the main branches of the Canal not yet executed. The ultimate effective power is calculated on the volumes that will be available when the Canal has its full supply of 10 feet at the head. The "present" effective power on the volumes that are available, with the supply at the present date, decreased as explained for irrigation and ordinary wastage. Actually the present effective power is much higher than shown in the Statement; but such excess is merely temporary, and is due to irrigation being as yet limited and none of the great branches open. Hereafter the latter will become new sources of motive power, but at present they are excluded.

*6th.*—It would, therefore, appear that at this time Government is in a position to offer to the community motive power equal to 19,847, or, in round numbers, 20,000 horse power, distributed favorably at different points throughout six of its richest districts, with water communication from any point in them now virtually open to Calcutta, and Railway communication in it may be hoped not very remote prospect.* There is evidently, therefore, power enough and to spare for all the purposes likely to prove good investments, and it is through private enterprise and with private capital that I must wish to see this power brought into useful action.

*7th.*—With this object I would recommend grants of water power being given to Companies or individuals on liberal and encouraging terms. In considering the amount which Government should demand for the use of the water, I have taken as my standard the average cost of generating steam for the engines of the Roorkee Workshops. Estimating this as nearly as possible, and, of course, looking only to the single process of creating the motive power, I find the rate has been about 3 annas per horse power per hour of work. I have no means of comparing this result with any obtained elsewhere, but the wood fuel necessarily used here is indifferent and has to be brought considerable distances. I therefore think the rate must be rather high for steam power, and I would fix that for water power very much lower, making it not

* So in original.

more than about one-tenth of the steam rate at first, and not carrying it higher during the currency of any contract than about one-fifth of the same. In a contract for ten years, I would be disposed to give the water for the first 3 years at 4 pie per horse power per hour, for the second 3 at 6 pie per horse power, and during the remainder of the contract at 8 pie per horse power, leaving it to the Contractors and Executive Officers to fix details on the above basis, and under the usual superior control as might be most convenient to all parties.

8*th*.—It would evidently be inexpedient to encourage any minute sub-division of the water for use as a motive power. The only condition under which Government can afford to give the power so cheaply is that the water, after having done its work as a mechanical agent, should be returned into the main Canal for its primary use in Irrigation. Minute sub-division must lead to sensible wastage and loss, which are to be avoided. I would therefore propose that grants of water power should be given in certain definite and minimum quantities to be termed mill powers; each mill power being that quantity of water which, with the fall available, would give a calculated useful effect equal to 30 horse power. Large concerns might have any number of mill powers they required, but for less than one mill power no grants should, I think, be given.

9*th*.—The charge for one mill power would be Rupees 0-10-0 per hour of work, or for a working day of 12 hours Rupees 7-8-0, rising gradually as proposed to a maximum of twice this amount. I may mention in passing that these rates correspond nearly with those realized by sale of water power in good localities for use with the common Native "punchukki," or small horizontal wheel, which does not economise more than one-third of the total power of the water.

10*th*.—As regards the practical work that might be done with the water power available on the Ganges Canal, general statements necessarily convey only very indefinite impressions. I may therefore be permitted to refer briefly to a special case in illustration of what the possession of a certain supply of water power enables energetic people to do. In 1852 I visited the Town of Lowell in the United States. It is well known as one of the creations of the New England manufacturing interest. The basis of its prosperity is the possession of water power equal to 8,965 horse power, or considerably less than half what is now available from the Ganges Canal, and less than one-fifth of that which will ultimately be at command from the same source. It stands on the Banks of the River Merrimac, the effective volume of which is 3,596 cubic feet per second; and a total fall of about 33 feet provides the moving force distributed into 40 mill powers, equal to about 65 horse power each: eleven manufacturing Companies carry on their operations and give profitable employment to an aggregate capital exceeding considerably 2½ crores of Rupees. There are in all 52 mills for various purposes, and the motive power for the different machines employed is communicated by 14 breast-wheels, 2 centre vent-wheels, and no less than 46 turbines or whirl-wheels, ranging in size from 8½ to 4½ feet in diameter, and with falls varying from 30 to 12 feet in height, 13,000 operatives find continual employment in these factories, and tall chimneys or clouds of black smoke were scarcely to be traced in the place. The special products of New England factories are not those which our Provinces here are suited to supply. The main use of machinery driven by the motive power of the Ganges Canal would be, I apprehend, to work up the raw agricultural produce of the districts into the forms best suited for export, to divest those products of every useless or superfluous part that added to their weight or increased their bulk, and thus to deliver them to the Merchant in Calcutta or elsewhere in such compact shapes as would reduce his charges on their farther transport to a minimum. To such ends more than twice the water power that has made Lowell

what I have described it to be can at once be made available, and I may add that as time passes on, and the works in progress are gradually completed, there will be placed at the command of the community in these Provinces from the Ganges Canal only water power about three times greater than the aggregate water power of France, as noted in the latest Statements to which I have access. I must hope that enterprising capitalists may be found who will convert some part of this now useless force to their own profit and the general good.

(Signed) R. B. SMITH, *Lieut.-Colonel,*
*Supdt. Genl. of Irrigation, N. W. Provinces.*

(True Copy)
C. B. THORNHILL,
*Offg. Secy. to Govt., N. W. P.*